

JOURNAL
OF THE
American Veterinary Medical Association
FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

H. Preston Hoskins, Secretary-Editor, 537 Book Building, Detroit, Mich.

MAURICE C. HALL, President, Washington, D. C.

M. JACOB, Treasurer, Knoxville, Tenn.

Executive Board

R. S. MACKELLAR, Member-at-Large and Chairman;

GEO. HILTON, 1st District; E. P. ALTHOUSE, 2nd District; L. A. MERILLAT, 3rd District;

C. A. CARY, 4th District; C. P. FITCH, 5th District; GEO. H. HART, 6th District;

C. H. HAYS, 7th District; N. F. WILLIAMS, 8th District; D. H. UDALL, 9th District;

O. V. BRUMLEY, 10th District.

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. Prices will be sent upon application.

Vol. LXXVIII, N. S. Vol. 31

March, 1931

No. 3

THE VETERINARIAN AND THE LAW OF SUPPLY AND DEMAND

Of recent years the attention of the veterinarian has been focused on the small number of graduates in veterinary medicine and the possible effect of this on the future of veterinary medicine. At the 1930 meeting in Los Angeles, the Committee on Education presented a very interesting and valuable report on this subject. The report indicates that if the present trend is prolonged into the future, there will be a decided shortage of numbers in the profession in the course of a few years.

As matters stand, the drop in the number of graduates that followed the closing of the private veterinary schools was not entirely to be deplored. Unquestionably it deprived the profession of some students who would have been a great asset to the profession, and some of these schools were especially strong in clinical material for study. On the other hand, it did serve in some ways, especially along the lines of academic training, to permit of some raising of the standards of education. It is impossible to weigh the advantages and disadvantages very accurately, nor would it serve much purpose to attempt an extensive analysis of these.

The important thing is to consider the relations of the present with the future, rather than with the past. The most desirable

situation would be one in which there was just the right supply of veterinarians to take care of the needs for veterinary services of all sorts. To have too few veterinarians for this purpose is to invite unfair and incompetent competition from persons who are not veterinarians; to have too many veterinarians is to invite cut-throat competition among veterinarians. Both of these possibilities deserve a bit of consideration and thought.

As regards a condition in which there are too few veterinarians we already have some illustrations of what may happen. There are some parts of the United States in which large areas are without competent veterinary service. Whether this is because the animal population of these areas is not of such a character or not present in such numbers as to warrant a veterinarian in attempting to practice there is beside the point at the moment. The thing which bears on our present thesis is that, in default of competent veterinarians, other persons, not trained in veterinary medicine, such as county agents and empirics, take over the role of veterinarian. In other words, if there is a vacuum there is the usual rush to fill the vacuum. Obviously, if such a shortage of veterinarians were widespread, many places which should be filled by veterinarians would be filled by others. Once others were well established in such places, it would be difficult, and in some cases impossible, to replace them by veterinarians.

Not only should the veterinary profession have enough graduates to fill all needed positions in practice, but it should work actively to take over, in fields other than practice, the positions not at present filled by veterinarians but involving veterinary work which should be done by veterinarians. Meat, milk and dairy inspection on any scale, national, state, county or city, should be carried on by veterinarians, or under their direction. We already have several lost provinces which we wish to regain in the field of veterinary medicine, and in some cases we have lost these because we would not take over certain activities except at our own price. It would pay at times to make some small personal sacrifice in taking over such activities for the sake of future benefits or for the good of the profession. Individually in his own city and through his organizations in his state, the veterinarian should do his share to have all veterinary work done by competent veterinarians.

We are not, at this time, facing the problem of too many veterinarians, but there is no reason why we should not consider that possibility. An oversupply of veterinarians might easily

be a calamity greater than an undersupply. There appear to be at present too many physicians, and 4000 new graduates are added to their ranks yearly. The result has been to invite the formation of groups composed of those who are established and who do nothing to make the lot of the young graduate easy, pleasant, or financially profitable, as well as to invite fee-splitting, unprofitable contract and lodge practice, and other things which grade from the somewhat unethical to a level with hi-jacking. Even the considerably higher standards required for admission to medical colleges of recent years have not served materially to improve the situation, since there are so many medical schools available and so many youngsters eager to join the ranks of the M. D.'s.

If we are to avoid the evils of too few or too many veterinarians we shall have to consider these problems thoughtfully and in good time. The present financial stringency and unemployment problem finds one of its origins in the fact that individual businesses are organized primarily on the basis of what they can produce, and that business as a whole is not organized in any way which will enable the business man to tell what he can sell. There is no overseeing agency to indicate on a board statistical basis, with a correlated consideration of all important factors involved, just how much in the way of goods can be disposed of to advantage in a given year. Business men not only blunder into such economic catastrophes as the present one without even a rudimentary knowledge of economics, but even inform us, as they did a couple of years ago, that the basic principles of economics have been set aside in favor of the United States. For the time being, it would be safer for the veterinarian to assume that such principles as the law of supply and demand were still operative and to consider how they affect him and his profession.

If we are to give these things adequate consideration, we should know some things we do not know and provide some things we do not have. For one thing we should know how many veterinarians we should have at any one time and how many we should graduate yearly in order to maintain the ranks of the profession at a level where the supply is approximately equal to the demand. As a preliminary to this, the American Veterinary Medical Association might conduct a survey to ascertain the location of all veterinarians in each of the various groups (practitioner, research, sanitary control, commercial, college, etc.) over the entire country,

the areas in which they operate, and the areas in which there are actual or potential needs for veterinarians without veterinarians to fill the needs.

With this information in hand, the American Veterinary Medical Association could estimate our needs, direct veterinarians to unoccupied areas, and cooperate with the colleges in recommending such changes in qualifications for admission as would result in supplying the needs of the profession without oversupplying them. This is a bare skeleton of action for the regulation of the number of veterinarians in this country, but it is put forth for consideration with the idea that if it has merit, the details can be supplied by those better informed. With such a program the graduate of the veterinary school would go out into a world in which there was some assurance that his services were needed. The requirements for admission to the schools could not only be raised in time, but raised at the right time and used as a valve to cut down the supply as the demand fell. It is no kindness to any student to throw him out into a world in which his professional ability will be less important for his success than will be his business ability or his lack of integrity.

The only alternative to an organized program looking towards maintaining the number of veterinarians at a level equal to the demand for veterinarians is to leave the matter to chance. What happens when matters of national importance are left to chance can be seen by an inspection of the breadlines. If we leave the development of our profession to chance because we do not give the matter consideration, it merely proves that we do not think, and we can all plead guilty to that indictment. But if we leave it to chance as a settled policy and on mature deliberation, it proves that we can not think, and our self-esteem must suffer severely if we are to admit that. Let us admit that the law of supply and demand is, within the range in which it operates, still in effect, and take steps to keep our profession as remunerative as possible by an observance of that law while trying to make it more remunerative by efforts along other lines. The cooperation of the American Veterinary Medical Association and the colleges along this line may keep us out of some of the difficulties which beset the physician. It is not enough that we study the medical profession to see what lines we should follow; we should also learn from their experience what situations we should avoid.

M. C. H.

DEATH DEALS CORNELL DOUBLE BLOW

Dr. Veranus A. Moore, former dean of the New York State Veterinary College at Cornell University, died February 11, following an operation, in the Ithaca Memorial Hospital. Dr. Moore was a former president (1918-19) of the A. V. M. A. And then, just as the forms for this issue of the JOURNAL are being closed, comes the word of the death, eight days later, of Dr. Pierre A. Fish, who succeeded Dr. Moore as Dean, in June, 1929. Dr. Fish served as the first editor of the JOURNAL of the A. V. M. A., from 1915 to 1918. Both men were members of the original faculty of the New York State Veterinary College. They were pillars of strength in the veterinary profession, and known in all corners of the world for their contributions to the advancement of veterinary science.

Full biographical sketches will appear in the JOURNAL next month.

APPLICATIONS FOR MEMBERSHIP

(See January, 1931, JOURNAL)

FIRST LISTING

- BOWEN, BECK B. 545 S. 1st Ave., South Saint Paul, Minn.
D. V. M., St. Joseph Veterinary College, 1918
Vouchers: G. E. Totten and M. E. Schwab.
- HARDING, ALBA EARL 411 S. Genesee St., Morrison, Ill.
B. V. Sc., Ontario Veterinary College, 1916
Vouchers: H. R. Schwarze and W. H. Welch.
- HILBERT, KENNETH FRANKLIN Merrick Road, Amityville, L. I., N. Y.
D. V. M., Cornell University, 1928
Vouchers: P. A. Fish and W. A. Hagan.
- LAWRENCE, ROBERT PARKER Walker-Gordon Lab. Co., Plainsboro, N. J.
V. M. D., University of Pennsylvania, 1930
Vouchers: J. G. Hardenbergh and J. B. Hagenbuch, Jr.
- MERCHANT, IVAL ARTHUR Iowa State College, Ames, Iowa
D. V. M., Colorado Agricultural College, 1924
Vouchers: Chester D. Lee and Russell A. Runnells.
- RUCKS, WILLY 1314 Valle, Buenos Aires, Argentina
D. V. M., University of Buenos Aires, 1922
Vouchers: E. A. Benbrook and Chas. Murray.

Applications Pending**SECOND LISTING**

- Brinker, William Theodore, R. 2, Box 82, Leetonia, Ohio.
- Buffin, V. C., Capt. Kenneth Earl, Fort Sam Houston, Texas.
- Busic, William H., Susanville, Calif.
- Jones, Eddell Charles, Platte Valley Serum Co., Grand Island, Nebr.
- Kraker, Louis George, 758 Lincoln Ave., San Rafael, Calif.
- Mootz, Charles E., 1119 N. Pennsylvania Ave., Mason City, Iowa.
- Watson, V. C., Lt. Edgerton Lynn, Carlisle Barracks, Carlisle, Pa.
- Weinhofer, John William, 214 N. 6th Ave., South Saint Paul, Minn.

The amount which should accompany an application filed this month is \$9.16, which covers membership fee and dues to January 1, 1932, including subscription to the JOURNAL.

COMING VETERINARY MEETINGS

- Northwestern Ohio Veterinary Medical Association. Hotel Commodore Perry, Toledo, Ohio. March 4, 1931. Dr. F. A. Lambert, Secretary, Box 53, Station C, Columbus, Ohio.
- Southeastern Michigan Veterinary Medical Association. Detroit, Mich. March 4, 1931. Dr. H. Preston Hoskins, Secretary, 537 Book Bldg., Detroit, Mich.
- Southeast Georgia Veterinary Association. Vidalia, Ga. March 4, 1931. Dr. Hugh F. Arundel, Secretary, Box 68, Quitman, Ga.
- New York City, Veterinary Medical Association of. Academy of Medicine, 5th Ave. and 103rd St., New York, N. Y. March 4, 1931. Dr. John E. Crawford, Secretary, 708 Beach 19th St., Far Rockaway, Long Island, N. Y.
- San Diego-Imperial Veterinary Medical Association. San Diego, Calif. March 4, 1931. Dr. A. P. Immenschuh, Secretary, Santee, Calif.
- Chicago Veterinary Medical Association. Atlantic Hotel, Chicago, Ill. March 10, 1931. Dr. C. L. Miller, Secretary, 508 S. Humphrey Ave., Oak Park, Ill.
- Kansas City Association of Veterinarians. Baltimore Hotel, Kansas City, Mo. March 10, 1931. Dr. H. J. Hearrington, Secretary, 1130 Franklin Ave., Lexington, Mo.
- Tulsa County Veterinary Association. Tulsa, Okla. March 12, 1931. Dr. J. M. Higgins, Secretary, 3305 E. 11th St., Tulsa, Okla.
- Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. March 18, 1931. Dr. W. L. Curtis, Secretary, 1264 W. 2nd St., Los Angeles, Calif.
- Ohio State University, Conference of Veterinarians at. Ohio State University, Columbus, Ohio. March 18-20, 1931. Dr. Oscar V. Brumley, Dean, Ohio State University, Columbus, Ohio.
- Keystone Veterinary Medical Association. Philadelphia, Pa. March 25, 1931. Dr. C. S. Rockwell, Secretary, 5225 Spruce St., Philadelphia, Pa.
- Maine Veterinary Medical Association. Bangor, Me. April 8, 1931. Dr. L. E. Maddocks, Secretary, R. F. D. 2, Augusta, Me.

Report of the Proceedings
of the
Thirty-fourth Annual Meeting
of the
United States Live Stock
Sanitary Association

Chicago, Illinois, December 3-5, 1930

WEDNESDAY MORNING, DECEMBER 3, 1930

The opening session of the thirty-fourth annual meeting of the United States Live Stock Sanitary Association, held at the LaSalle Hotel, Chicago, Illinois, convened at 10:45 a. m., Dr. A. E. Wight, Chief, Tuberculosis Eradication Division, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C., president of the Association, presiding.

PRESIDENT WIGHT: The thirty-fourth annual meeting of the United States Live Stock Sanitary Association is now declared in session.

Gentlemen, we are especially honored with our opening speaker. Mr. Woods is here and is ready to address us. I am very much pleased to have the opportunity to introduce to you Mr. William Winfield Woods, president of the Institute of American Meat Packers, Chicago, Illinois. (Applause)

OPENING ADDRESS

By WILLIAM WINFIELD WOODS, Chicago, Ill.

President of the Institute of American Meat Packers

MR. CHAIRMAN AND GENTLEMEN:

I am very happy to bring to you the greetings of the Institute of American Meat Packers.

As I always do, I have to disclaim the introduction because I am no speaker but am working in the industry. Whenever I am introduced as a speaker, it is my custom to explain that I find myself in the position of the fellow who was arrested for deserting his wife. He said that he wasn't a deserter, he was a refugee. (Laughter)

But I am glad to be here with you this morning and meet some of your associates. We came up in the elevator with Dr. Barger. He saw Mr. Davison, of our office, a great big strapping fellow, as you know, one of our vice-presidents, who said, "Yes,

I remember meeting you in Iowa. I was very unhappy a few minutes afterwards."

I thought to myself, "That is nothing. Your Association was organized about 1896 and very shortly afterwards the United States went to war with Spain." So I don't know but what that makes us even. Of course, I do feel at ease because we have a common interest in live stock; you folks want to cure them and we want to kill them. (Laughter) But there are other points of interest, too, in live stock.

We are both interested in this great live stock and meat industry, and I assume that you, as we, are interested in anything that happens to live stock and anything that influences the demand for live stock. The demand for live stock, of course, is influenced by the demand for meat. It is influenced by the esteem in which meat is held. It is influenced by the quality of meat that is produced and how well that meets the consuming demand, because if they like it they eat more of it, and that makes for more live stock, and that enlarges your interests and it enlarges ours. It is affected, of course, by the efficiency with which those live stock products are produced. So I take it for granted that as folks interested in live stock, I am talking to men who are interested in the entire passage of that live stock from the farm to the table, interested in the toll that is put on it, interested in the efficiency or inefficiency with which it is processed, interested in the progress or lack of progress with which the entire industry keeps up with the progress of other industries.

PACKER PLAYS THREE ROLES

Now, all of this live stock, of course, passes through the packing-houses. The packer is the manufacturer and the wholesaler, the marketing agent of the live stock producer. His industry furnishes the outlet for practically every pound of this live stock except that slaughtered in a very local way or on the farm. Consequently, how the packers do their job, whether they do it well or whether they do it badly, whether they are up to snuff or not, is a matter of concern to you as it is to me.

I think we might consider the live stock itself in the producing division of the business just for a moment. You can view it, of course, in any one of several ways. You can consider with most emphasis the fact that the live stock enrich the soil, or you can consider that the live stock utilize certain waste and roughage which otherwise might not be utilized advantageously, or you

can consider that the live stock furnish a very convenient means of marketing grain and other crops, and sometimes a more profitable means of marketing those crops. However you view them, they are important.

I think it is interesting to recall just what has happened to the numbers of live stock during approximately the period in which this Association has been functioning. I notice from your literature that it is thirty-four years old. I had a table compiled by ten-year periods showing the population of live stock in the United States. The nearest date to the organization date of your Association is 1900.

In 1900 the cattle on farms numbered 58,000,000. In 1930 the cattle on farms numbered 58,000,000. In 1900 the swine on farms numbered 53,000,000. In 1930 the swine on farms numbered 53,000,000. Sheep increased. There were 45,000,000 on farms in 1900 and 49,000,000 in 1930.

RELATIVE CONSUMPTION OF MEAT

In that period, the population of the United States, the number of people, increased 47,000,000 or about 60 per cent. While that increase of 47,000,000, or 60 per cent, was taking place, you had a moderate increase in sheep and you had no increase at all, as between those two particular points, in cattle or in swine. Does that mean that we are eating 60 per cent less pork per capita, or 60 per cent less beef per capita? It doesn't. On the contrary, we are eating more pork per capita. We are not eating so much beef per capita, but we are eating more beef *in toto* and we are marketing more hogs and more cattle *in toto* out of herds of approximately the same size. So whatever else those figures mean, they are evidence of the increased efficiency in live stock production.

You may be interested in approximations of what meat consumption will be this year when the figures of the Department are available. As you know, we get them from month to month. We haven't very much farther to go now, so that the quantities are roughly calculable. I don't offer these as precise figures, but they are interesting as approximations.

Pork should show an increase of four to six pounds per capita in spite of that 47,000,000 increase in population, in spite of the fact that the number of swine is about the same, as compared with 1900.

Lard should show an increase of a pound or two as compared with 1900; veal, three or four pounds; lamb, little change. These are per capita figures. Beef will be below the 51.4 pounds consumed per capita in 1929 as compared with 67.8 pounds in 1900, but the total of beef, as I indicated a moment ago, is greater than in 1900, although less, substantially less, per capita.

The present consumption of beef, however, is probably not a permanent level because even in recent years we have had a much higher peak for beef consumption. In 1926, for example, we reached a peak of $63\frac{1}{2}$ pounds per capita. That was the last peak in the swing. That wasn't so high as the consumption in 1900. So much for the quantity of live stock and for the quantity of meat eaten.

THREE INDUSTRIES UNDER ONE MANAGEMENT

What lies between those two statistics, the live stock on the farms and the meat on the table or in the retail shops? Of course what lies between is the packing-houses. The packing companies are just one division of one single industry. They are part of a single industry. We often lose sight of that, I think, because we call one part of the industry "producers" and another part "packers" and another part "retailers," but, after all, it is just one industry with three divisions, the producing division, the manufacturing and wholesaling or distributing division, and the retailing division.

I wonder if it ever occurred to you that an industry with three divisions, under different ownership, has exactly the same obligations, that the public expects exactly the same thing of it, and that it has exactly the same requisites for the highest form of industrial success and industrial service and industrial prosperity as an industry wherein those three divisions are under one ownership. There isn't any difference at all fundamentally.

Take the oil industry for an example. Certain of the Standard Oil companies no doubt produce their crude oil—the producing division. Then they have their refining establishments, so they own the processing or manufacturing division, also, and then they have their retail stations. So they own the producing, manufacturing and retailing divisions. They are all under one ownership.

Our requisites to successful operation of this great live stock and meat industry are not different just because in this industry those three divisions are under different ownership.

Consider this situation: Suppose that the producing division of the Standard Oil Company of Indiana should say: "We do our job very well, but those fellows in the refining division ball it up for you consumers, and they make a mess of Standard Oil service." Or suppose that you drove up to a filling-station, and the filling-station attendant, representing the retailing division, said, "Well, I will tell you, we could do a lot better and we could give you this oil a lot cheaper and with a lot less carbon in it and give you a lot better quality of gasoline if it weren't for the clumsiness and dishonesty of the manufacturing and producing divisions." Naturally, the consuming public would avoid the stations of that oil company if that sort of lack of good will existed among the producing and manufacturing and retailing divisions of that industry.

OTHER REQUISITES BESIDES GOOD WILL

It is quite apparent when you transfer your view to another industry that one of the first requisites to the success of any industry is good will, deserved good will, among the different divisions of that industry. However, that is just one requisite to the highest industrial success of any industry. I should like to enumerate some of the other requisites, or at least desiderata, if they are not absolute requisites, of the successful operation of this great industry in which you and I are both engaged, or of any other industry:

First, reasonable, lawful coöperation by the companies in the industry. (I will take up each of these in a moment.)

Secondly, adequate, adaptable raw materials.

Thirdly, well-trained personnel.

Fourthly, efficient operating.

Fifthly, adequate, precise control.

Sixthly, research and development.

Seventhly, good relations with the public.

Eighthly, good business practices.

All the live stock goes through the packing division. All of the output of the producing division comes through the manufacturing division. I want to tell you, if I may, of some of the things done by the packing division through the Institute of American Meat Packers toward accomplishing some of the things just enumerated.

First of all, as to the coöperation of companies in an industry and the necessity for that coöperation. I think that is one of the

most interesting developments that we have in business today. You see it not only in the packing industry, you see it in oil and in steel and you see it in copper and you see it all around—the necessity for functioning as an industry as well as a company.

You may compare the industry to a ship. You may compare the companies to the staterooms on that ship. It does not profit a man to have the finest stateroom or the largest stateroom or the best kept stateroom on the ship if the ship isn't going forward, or if it is going off its course, or if it is running badly. Business men have found today (and I think it is one of the most significant developments of our time) that there must be an enlightened coöperation among the different companies of an industry in behalf of the common interests of that industry, if the industry is going to hold its own.

THE INSTITUTE OF AMERICAN MEAT PACKERS

We have that in our live stock and meat industry. You have your Association here; you have the live stock associations. We have the trade association, the research and educational association of the packing industry, the Institute of American Meat Packers. It consists of more than 200 packers. It consists of the most bitter competitors you ever saw. I have heard their competition described as almost murderous, by observers, so keenly do they compete for raw materials and for sales. On the other hand, where the interest is common, where 200 people working together can serve the interest better than one could working alone, we have the closest coöperation, as I shall try to indicate to you.

Then there are those other aids to successful industrial operation: Adequate, adaptable raw materials. Of course, that touches your interest very closely. By adequate raw materials I mean raw materials suited to consuming demand, not only in quality but in quantity. We haven't got that yet. We have fluctuations that are disturbing to the packer, disturbing to the producer and disturbing to the consumer, because with unstable supplies and a relatively stable demand, we have unstable prices. At the moment, of course, we haven't a typical stable demand, but usually we do have. Those ups and downs, with hogs selling at one figure one year and another figure another, with 43,000,000 hogs one year and 49,000,000 hogs another, and prices shifting in proportion, make an undesirable situation. We all need to

work together to promote a better adjustment of supply to demand.

These materials must be adaptable to consuming taste also. In the long run, you can't make the consumer buy a product and like a product and value a product which does not give that consumer what she wants. We found that out with respect to a number of products both in the live stock division and in the meat division.

You have noted the tendency, of course, in all classes of animals, by and large (I am not speaking of a particular time), toward the lighter weights, toward the leaner meats. We have done what we could to promote adaptable raw materials. We have given an impetus and encouragement to the producer's effort to develop a meat type of hog instead of the lard type of hog. At the moment the fat hog is doing very well, but the general trend of the times is toward a leaner hog.

SOFT, OILY PORK STUDIED

To study the possibilities of producing such a hog efficiently we made a grant of some \$14,000, I think it was, to Purdue University to carry on a study in breeding and feeding. In the same way we found there was a prejudice in commercial channels against the soft and oily pork. One of our packers reported that he got a shipment of that sort of stuff from a competitor. He went into the car to take the meat off the hook, and one pork loin just jumped at him and wrapped itself around his neck, and it was quite a time and quite a harrowing experience before he could get disentangled from the soft and oily pork loin. We thought it was time to do something about that situation. We made a research grant of some \$9,000 to Yale University to study supplements for peanut feeds and other feeds that it was said were giving us this soft and oily pork. I can't say that everybody working together has cleaned up the problem, but at least efforts have been made toward a solution.

Then, we must have a well-trained personnel, because industries are something more than brick and mortar. Toward that end, the Institute has organized, in coöperation with the University of Chicago, an institute of meat packing, which is a division of the School of Commerce at the University. A young man who has had an education in an agricultural college or has had three years in a college of liberal arts, with a reasonable amount of economics or subjects related to business, or in a school

of commerce, can go there and take a final year that includes about four or four and one-half months of specialization in packing-house subjects. In other words, the man who wants to go to college and also enter this live stock and meat industry in its packing division, can go to the University of Chicago, or come there from another institution and register in this institute of meat packing, get his college degree and at the same time get a half-year of specialization in packing-house economics, packing-house accounting, packing-house merchandising, beef and pork operations, taught by Dr. Eagle, who is a friend of you gentlemen, and, in general, can enter the industry with a better perspective and with a more nearly focused point of view than if he had approached it through some other channel.

For the men who are already employed in the packing industry, that institute of meat packing offers correspondence courses. It also offers here in Chicago, and our Institute of American Meat Packers has offered elsewhere, evening classes for men employed in the packing industry. Through those several classes of courses, we have had several thousand men take training, fewer of them in the resident courses, more of them in the evening courses and in the correspondence courses.

But it is important, we feel, to give these men a viewpoint on the operations of the industry as a whole, its agricultural background, its basis in the live stock in which you are interested, and its commercial operations in the packing division.

PACKING HOUSE PRACTICE

Then you must have efficient operations. After these live stock, in which you are interested, come into the plant, it is really our obligation to do an efficient job in processing them. We have a Committee on Packing House Practice, with which Dr. Eagle also has been very closely associated. He at one time was chairman of this and three other committees but relinquished three of them because he was so busy. Any packer who has an operating problem may get help from a committee composed of the practical experts of his competitors. They will go out and try to sell his customer, and they will try to outbid him for a hog, but if he makes a bum ham or a bum piece of bacon, or doesn't know how to trim his pork loins, or has too much free fatty acid in his lard, he can write in, and if we don't know the answer, we go to one of his competitors and get it, to the end that we may have genuine coöperation along legitimate lines. It serves the further

purpose of tending to keep the product of the industry respected by keeping the quality up, because every pound of inferior lard hurts almost every pound of good lard. That is coöperation on packing-house practice.

We also felt that the experience of the men who had learned one thing after another in the packing industry should be preserved, that if they went into another industry their knowledge should not vanish with them.

It reminds me of that old story of the young fellow down in Alabama who came up for his examination for admittance to the bar. The examination was given by one of the justices of the Supreme Court. He said, "Young man, have you read Blackstone?"

The young man said, "No."

He said, "Have you read Coke?"

The young man said, "No."

He said, "Are you familiar with the common law in any of its aspects?"

The young man said, "I can't say that I am."

"Have you studied the Constitution of the United States?"

The young man said, "No, sir, I haven't read it."

He said, "Well, young man, what do you know?"

"Well, I know the statutes of the great state of Alabama. I know the code."

This justice said, "You had better look out, young man, some fool legislator will come along and repeal all your knowledge."
(Laughter)

OPERATIONS OF PACKING INDUSTRY CODIFIED

Of course, we didn't want that to happen in the packing industry. We felt that there should be an operating literature of the industry, that there should be some recording of good common practice. So we have a Committee on Recording, the chairman of which is Dr. Eagle, whom you will observe I have not mentioned before. (Laughter) That committee has published a number of fat volumes setting down the practical operations of the packing industry, beef and pork and by-products and small stock.

Then we felt there was a great waste in the useless variety and sizes and multiplicity of equipment and supplies, so we appointed a Committee on Standardization. That committee has been developing specifications which it regarded as model and adequate for sizes of containers, for types of equipment. The thing isn't

compulsory, it isn't entirely comprehensive, but it has been a step in the direction of economy, because there is no use using 100 sizes if 50 sizes will do, and it actually adds a burden on the live stock industry in which we are interested.

Then, we felt we must experiment, too, mechanically in the plant. We have a Committee on Experimentation. Recently, one of the most interesting experiments which has been going on for some five or six years has been to stun cattle by electricity. Some of the folks associated with the experiments say it works very nicely and the cattle almost seem to like it. But I question whether the experiment has gone quite that well. However, we think it is promising.

Of course, no industry must stand still. You must provide for research and development, by whatever name you call it. There must be an opportunity to try sound, new methods, like the fisherman I heard about the other day who tried a new method. He had gotten himself a can of the most magnificent angleworms you ever saw, great big fellows, almost as big as your finger. He fished and fished and fished and never got a bite. But he had a flask with him which contained some very strong whisky. He took that flask out, pulled the cork out, took one of these earthworms, dipped it in the whisky and cast it out into the water. The minute it hit the water—zip! After a tremendous struggle, the fellow was perspiring and tired, he finally hauled up that trout. As he went to take him off the hook, he found he wasn't hooked at all, the worm wasn't even in the trout's mouth. On the contrary, the worm had its jaws extended and had this trout clutched by the throat.

DEPARTMENT OF RESEARCH

So we have tried to provide for the use of new methods, particularly sound ones. We have even tried to develop them. We have done that in several ways. We have a department of research. That department of research operates a research laboratory which we were enabled to start through the generosity of Mr. Thomas E. Wilson who gave us \$15,000 to do it with, out at the University of Chicago. Out there we have been working on curing, on conservation and on lard. We also maintained for some time a fellowship on lard, under Professor Bailey, at the University of Minnesota.

In addition to our research through that department, we have conducted certain research in home economics. We feel that if a

lady knows how to cook meat as well as possible, she will like meat better and use more of it. Consequently, we had a research study of certain cooking methods, made up at Ames, such simple things, for example, as how to roast a piece of meat, how to broil bacon. Through this institute of meat packing, we have financed, in coöperation with the University of Chicago and other agencies, certain research on the subjects related to the commercial or business side of the industry. For example, we had a study made of the effect of prices on demand, correlation of prices and demand for meat, a study of chain-store merchandising as affecting the packing industry, and a study of the voluntary change.

I shall not discuss the question of good will between the packing and retailing divisions other than to say that at one time there was very bitter criticism of the retailer's profit. We had a study made which indicated that the greatest part of his margin went for his expenses. That was made by Northwestern University and was afterwards followed up by the government.

GOOD RELATIONS WITH PUBLIC PROMOTED

I would like to talk about the necessity of good relations with the public for any industry, because the public constitute the customers of the industry. When the Institute was organized the product of the live stock in which you are interested, the live stock grown by the producers, was very much slandered. Everybody had taken a whack at meat. So we felt that it would be a good thing to collect all of the current opinion of the nutrition specialists and dietitians and others about meat and put it into one or two books. We engaged a director of nutrition for that purpose. That was Dr. E. B. Forbes, now of the Department of Animal Nutrition at Pennsylvania State College. He was succeeded by Dr. Molton.

We found when we got that book together that the opinion of meat was very much more favorable than the general practitioner's opinion of meat. So we sent it to the general practitioner.

Then we started out after the advertisers who were slandering these live stock products. I want to show you some of the things that were being said about meat and said to millions of consumers. In showing them to you I don't mean to criticize these advertisers. On the contrary, the good nature and the fairness and the progressiveness with which they met our representations testifies to their own liberality and sense of equity.

Here is one by Cream of Wheat, for example, a great big scale with an enormous piece of steak and about a dozen eggs and two or three tomatoes or apples, and some other food that is hard to identify, a bottle of milk, and Cream of Wheat on the other side of the scale. This little box of Cream of Wheat weighs down the whole works. We didn't like that, so we wrote to them and told them that we didn't think that was fair because they had measured meat in just one way. They decided they wouldn't print other advertising like that. This advertisement of Cream of Wheat carries a picture of a meat loaf and says, "This will become one of your favorite recipes," which we hope is the case.

One of the most flagrant slanderers of meat was Shredded Wheat. They took a solemn referendum, according to their heading, and apparently resolved that "Shredded Wheat is a substitute for meat, eggs and potatoes for any meal, much more nutritious and costs much less." That seemed to go pretty well, so they added this: "Less meat; more wheat." Then they said other things about meat that I don't even care to read to you. After a great many months of negotiations, they decided they would eliminate that form of advertising.

MEAT MISREPRESENTED IN ADVERTISEMENTS

There was Snider's Catsup that said meat was lacking in certain sorts of vitamins. Our position is that you don't have to set out and eat any one particular food to get your supply of this or that, but if you will eat all around the clock in a well-assorted sort of way, please your palate, you will be all right. Snider's Catsup was very fair about changing their form of advertising.

Realize, gentlemen, that these were going to millions and millions of consumers. These are just examples, not a comprehensive statement of the cases.

Here is the Nashville Pure Milk Company. It is typical of a good deal of advertising that was done of dairy products at that time. "A quart of good milk equals in energy food value any of these." Among other things it equals $9\frac{1}{2}$ oranges, and what we are interested in is this: It equals three-quarters of a pound of beef. The National Dairy Council itself put out certain charts and said that a quart of milk was equal to so much meat or thirty-two pounds of tomatoes. Just imagine a fellow deciding that he would go out and substitute thirty-two pounds of tomatoes for a nice beefsteak. It would be a very awkward and incon-

venient luncheon pastime. They made the comparison solely in terms of what they called energy food value. They have graciously quit that advertising, and we appreciate their attitude.

Cracker Jack. We were getting so sensitive by that time that we didn't even like mild disparagement of meat. "This delicious popcorn food confection contains one and one-half times the nutriment of sirloin steak." That hurt our feelings, and they agreed to stop it, although they said they never dreamed that Cracker Jack would take the place of meat.

Dr. Copeland, the United States Senator, who runs a health column, said, "Lean meat is almost pure protein. Almost everything we eat contains protein, but meat is the chief source of protein supply for the average person." Then he says, "You must bear in mind, however, that you need less protein than you do all the other foodstuffs. Four ounces a day is enough. If you have eaten three or four ounces of protein already, you can see that a quarter- or half-pound of meat in addition will cause you to exceed your supply by a whole lot." Dr. Molton couldn't sleep. He sat down and wrote Senator Copeland a nice letter. Senator Copeland came out with another article in which he said: "Perhaps somebody else got the same wrong impression from what I said, and I desire to set him right at once. I am sure of one thing, however. Nobody can ever get the idea that I am opposed to meat eating." He isn't in this state, so we can't vote for him. (Laughter)

FOOD RULE CHANGED

The Metropolitan Life Insurance Company, which distributes material by the hundreds of thousands and maybe by the millions of copies, put out some material on nutrition. Oddly enough, they had their nutritional element written by Professor Irving Fisher, the economist. I don't know what the hook-up was, but Professor Irving Fisher wrote some of this nutritional material. Food Rule No. 7 was: "Do not eat much meat and eggs." We visited them in New York, and we wrote to them. They very graciously changed Food Rule No. 7 to read: "Do not eat too much or too fast." (Laughter)

Of course, a great deal of the lack of good will between an industry and its public springs from misinformation. Not only was our product slandered and the product that comes from these live stock, but the profits of the packing industry were misunderstood. It is easy to understand how that could happen in any

industry. Some division thinks some other division is taking too much out of the business. One partner thinks the other one is getting too much of the profit.

When the Institute was organized, the packers were accused under rather peculiar circumstances (I mean there was a campaign of publicity against them at the time) of being profiteers. Today they almost wish they were; it would carry a certain consolation. For years it was one of the most difficult points we ever had to correct. It was almost impossible to get credence for actual facts, even when they were certified by the Food Administration.

I had a compilation made of the profits of varying numbers of packing companies. We are indebted in recent years to the Packers and Stockyards Administration for some very interesting figures on that subject. I had these made last year and they include only four companies for 1929. They include varying numbers of companies for other years, running up to as high as 680 companies in one year. I simply aggregated all their sales and all their profits for the period of 1913 to 1929. Then, just to get an average, I aggregated the capital investment. Of course a statistician would quarrel with the last method, but it gives us what we want here, I believe. That procedure will show the sales and profits of these packing companies from 1913 to 1929. The sales were \$48,631,000,000. There were \$48,631,000,000 worth of products sold in that period. The profits in the same period were \$638,000,000. The profit rate was a cent and one-third on each dollar of sales, and the profit rate on investment was 5.9 per cent in that period.

PROFITS OF PACKING INDUSTRY NOT EXCESSIVE

I discovered another very interesting thing. I took out of that period the profits and sales in the years affected by the war, the years of deflation and the years of inflation, the period from 1915 to 1922. If you will exclude that war period which includes the period when values went up and everybody made a big inventory profit which they afterwards lost, and take both the losses and the profits out, you will find that the profit rate becomes 1.7 per cent per dollar of sales greater, and the profit rate on investment becomes 6.6. I imagine that is true of many other businesses. If you consider the whole period, you will find that instead of having realized a net gain through that period of inflation, industries didn't. I have referred to retail profits.

There is one other item I should like to take up, and that is the question of good business practices. The modern tendency is all in the direction of good economics and fair play. A little over a year ago the Bureau of Animal Industry, U. S. Department of Agriculture, the Secretary acting through the Chief of the Bureau, called a conference of all packers and wholesalers whether members of the Institute or not. They adopted, under the auspices of the Department, a code of trade practices which contains this language:

Now the entire industry is agreed that the adoption of a code of trade practices is desirable. The packers and wholesalers of the United States are willing and eager not only to eliminate wasteful, uneconomic and unsound practices and methods, but to condemn and prevent as far as possible all unfair and unethical trade practices and methods. They believe that the meat trade and the public as well as the packing industry itself would be benefited by the elimination of such practices and methods. To promote such objects, the packers and wholesalers of meat agree to abstain from the practices hereinafter set forth in the following code of trade practices.

That has operated to the benefit and the increased good practice of the industry.

In those ways, then, gentlemen, we have tried to cooperate with other factors in the industry, in processing efficiently the live stock in which you are interested and in raising the service and the soundness of this industry to higher levels and to higher esteem.

PRESIDENT WIGHT: Next on our program, according to the proceedings of previous meetings, is the President's address. This year your President has prepared a few remarks which he takes great pleasure in presenting at this time.

. . . President Wight read his address. . . .

THE ADDRESS OF THE PRESIDENT

By A. E. WIGHT, Washington, D. C.

Chief, Tuberculosis Eradication Division,

Bureau of Animal Industry, U. S. Department of Agriculture

MEMBERS OF THE ASSOCIATION AND GUESTS:

On this occasion which marks the 34th annual meeting of our Association, I am greatly pleased and deeply appreciative of the honor extended me by selecting me for your President this year. It is indeed a very high honor to receive such a distinction, and to be able to aid this Association in any way possible. In presenting this message to you, I shall endeavor to outline briefly some of the thoughts that may properly be considered at this time.

TICK ERADICATION

It is worthy of more than passing notice to comment on the remarkable progress that has been made in the great undertaking of tick eradication. The United States Live Stock Sanitary Association was really brought into existence thirty-four years ago because of the absolute necessity of taking steps to control the spread of tick fever in cattle. This Association has worked continuously to bring about better methods in tick eradication; also, to assist in obtaining the necessary appropriations to carry on the work. Systematic tick eradication did not make much progress until approximately twenty years ago. However, a considerable amount of preliminary work was done by the Bureau of Animal Industry of the United States Department of Agriculture and the various coöperating state forces for a period of about five years, beginning about 1906.

Originally, there were 985 counties in the United States, comprising an area of 728,565 square miles, which were quarantined on account of cattle ticks. Since the program of eradicating the tick has been under way, 839 of these counties have been released from federal quarantine, leaving 146 counties where the work must be carried on to completion. The work to be done in finishing tick eradication is more of a task than would appear when the comparatively small number of counties still infested is taken into consideration. We all know what an undertaking it is to eradicate cattle ticks under any circumstances, but in these counties where the ticks now exist, located as they are in open range and swampy sections of the country, the task is extremely difficult.

Those engaged in this project should continue to receive the encouragement of this Association, and I am sure that such will be the case. If only reasonable progress can be made in the elimination of the cattle tick from the remaining 146 counties, it will be only a few years before there will be no cattle ticks in the continental United States. The successful termination of such a great undertaking is certainly a commendable one, and one for which this Association is entitled to much credit.

HOG CHOLERA

This Association has devoted a great amount of time and thought to hog cholera as well as other diseases of swine. Much good has resulted from the deliberations and valuable contributions made to the program of this Association from year to year

in connection with the disease of these valuable farm animals. It is hoped that in future years the Association will continue to keep this important subject in mind.

FOOT-AND-MOUTH DISEASE

Fortunately, no outbreaks of the dreaded malady, foot-and-mouth disease, have appeared in the United States for almost two years. The knowledge gained from experience in the previous campaigns to control and eradicate foot-and-mouth disease has resulted in great benefit to the people of this country, especially the owners of live stock. Should another outbreak of foot-and-mouth disease appear anywhere in this country the live stock industry can rest assured that it will be handled promptly and efficiently by the most approved methods.

PARASITIC DISEASES

Internal and external parasites cause heavy losses among our domestic animals each year. During the last few years several programs have been developed to control internal parasites of live stock. Among these is the highly successful McLean County System of Swine Sanitation. More time and study is being devoted to the problem of eradicating internal and external parasites of all kinds of live stock. This work should be encouraged. As our great country develops it is only natural that parasites affecting live stock will be more in evidence unless vigorously opposed. This Association can be of great assistance in outlining a program looking to the extermination of animal parasites.

TUBERCULOSIS

The United States Live Stock Sanitary Association, at its meeting in 1917, laid the very foundation of the gigantic undertaking to control and eradicate bovine tuberculosis in this country. The prescribed plan has been followed very closely, and the necessary changes since that time have been prepared and approved by this Association.

Each year since 1917 we have devoted a considerable amount of the program to this important subject. From now on, even though the subject must be given careful thought at all times, it will, in all probability, be possible to take some of the tuberculosis time for several other subjects on which there is a need for the full expression of your views and the formulation of plans for action. Later in the meeting, a special paper on the progress and developments of the tuberculosis-eradication campaign will be presented, so I shall not devote more time to its discussion now.

DISEASES OF POULTRY

Domestic poultry are susceptible to numerous diseases, the two most serious of which, in the United States, probably are bacillary white diarrhea and tuberculosis. Much attention has been given these subjects during the sessions of this Association, and more time could be spent to advantage in developing plans for better handling of these maladies. This Association has a Committee on Diseases of Poultry which is a valuable adjunct to the successful operation of the Association.

It is especially important at this time that more attention be given the problem of eliminating tuberculosis in poultry. Avian tuberculosis, being so readily communicable to swine, causes a great loss each year in the condemnation of portions of hog carcasses.

REGULATION OF THE MOVEMENT OF LIVE STOCK

The regulation of live stock movement, from a disease-control standpoint, is a question which comes before us each year. As a result of the deliberations of this Association, a considerable amount of uniformity has developed in connection with interstate regulations. Much more can be done to advantage. As far as bovine tuberculosis is concerned, the regulations, while not ideal, have certainly been greatly improved during the last ten years, so that today they are quite satisfactory.

Much still remains to be done in developing more satisfactory regulations pertaining to the interstate movement of cattle in order to prevent the spread of bovine infectious abortion. No doubt, as time goes on, we shall witness a decided improvement in this connection. Before the advent of the motor truck the movement of live stock was principally by railroads, but today the situation is different. Each live stock sanitary official has a tremendous problem in controlling the transportation of live stock by truck, so as to prevent the spread of contagious diseases in live stock.

BOVINE INFECTIOUS ABORTION

The economic importance of abortion disease has reached a point where it becomes necessary to devote more time and consideration to its control and elimination. The disease is apparently very widespread throughout the United States, and probably causes a greater loss to the cattle-raisers than any other disease with which they have to contend. We are conscious that much work has been done in the study of abortion disease, and

equally aware that the program of research is now receiving more attention throughout the country than at any time in the past.

It is also of much interest to note that considerable progress is being made towards the establishment of abortion-free herds of cattle in various parts of the country. The owners of live stock are apparently ready to accept any sound plan that may be advanced to place this disease under control. With the increased resources now available to carry on research work in the laboratories and experiment stations, as well as to carry the projects to the people throughout the country, there is encouragement that some method will be developed within a few years so that abortion disease may be effectively controlled and eventually eradicated. This Association can be one of the greatest factors in hastening the attainment of such results.

MISCELLANEOUS DISEASES

There are a number of other diseases, some of which are confined to certain localities, that will not be discussed individually at this time. These transmissible diseases of live stock are important, however, and should be studied and controlled as far as possible. Two that probably should be given more than passing notice are rabies in all animals and anaplasmosis in cattle.

NUTRITIONAL DISEASES

At a number of previous meetings of this Association, very valuable papers have been presented on the subject of diseases of live stock that may be attributed to faulty nutrition. Committees of this Association have devoted to this subject much time and effort, which has resulted in bringing to our meetings valuable information on this important subject. The study of the effect of improper nutrition, which is the cause of some troublesome diseases of live stock, is being continued at the various scientific institutions throughout the country.

The appointment of such a committee was inadvertently overlooked this year, but it is deemed important to have such a committee to attend to this subject, not only to aid in the program of the meeting by furnishing some of the more recent information in the form of papers, but to present to the Association a brief review of developments in connection with this subject since the last report.

Live stock owners and sanitarians realize the importance of the proper feeding of live stock to prevent diseases that may develop as a result of improper diet. The reports of this Associa-

tion do and will contain most valuable references to the latest publications of scientific investigators of work done in this connection.

MILK AND MEAT HYGIENE

In the constitution and by-laws of this Association, which were adopted at our 29th annual meeting, in December, 1925, it is provided that the subject of Milk and Meat Hygiene receive attention. While it is true that we have in this country a most efficient meat inspection service in our federal government, this service does not apply to a great many cases because the meat products involved are not shipped interstate. The meat inspection system which is not covered by federal inspection should be improved and made more uniform. I trust that this Association may be most helpful in bringing this about.

The general improvement in ways and means of handling milk and other dairy products has been very noticeable during the last ten years. Our Association can well commend the activities of health officers and others upon their good work along this line.

GENERAL STATEMENTS

In this organization, which has so successfully functioned and remained intact during the last thirty-four years, we have, fortunately, a combination of scientific workers, regulatory officials, progressive live stock owners, and others interested in the welfare of the live stock industry. Let us strive to increase our membership, thereby obtaining the benefit of the judgment and experience of new members and at the same time extending the influence and usefulness of the Association.

This organization has made it possible for state and federal officials to get together in annual conferences and develop plans for the control and eradication of diseases of live stock. It has served as an exchange or what may be termed a "clearing house." There have been some outstanding developments that have served to bring favorable comment on the activities of this great association.

All live stock sanitary problems are important, although in some states certain diseases cause much greater losses than others. Here in this Association we take up the subject of all diseases of live stock as far as possible within the limited time we are here. Our interest is not only spread out over our forty-eight states and territories, but we also most heartily welcome to each meeting our distinguished members and friends from the Dominion of

Canada, Mexico and Cuba. The United States Live Stock Sanitary Association is an organization of those who are interested not only in the live stock industry in the United States, but also in the conditions pertaining to live stock in other countries.

This Association welcomes and notes with much gratification that steps are taken from time to time in connection with a better understanding of live stock sanitary conditions from an international standpoint. An excellent illustration of an activity of this kind is the Inter-American Conference on Agriculture, Forestry, and Animal Industry, which was held at Washington, D. C., in September of this year.

It has been the policy at some of the meetings of this Association to have reports on the prevalence of infectious diseases of live stock from the various state live stock sanitary officials. Such reports are always very interesting, and can not help but be of some benefit to all concerned in this problem. It would, perhaps, be a desirable move on the part of the Association to have a committee to develop some plan whereby information regarding the prevalence of communicable diseases and the more serious parasites of live stock could be gathered annually from the most reliable sources. Such statistics could then be tabulated and presented for publication with the proceedings of the meetings of our Association. By so doing it is believed that the information obtained would be reliable, and would certainly reach those who are most interested in the subject. The reports of this Association are widely distributed, not only to its approximately 500 members, but to many others in this country as well as in Canada and other countries.

In conclusion I wish to pay my respects to my co-workers who have given me the honor of becoming President of this Association. I also desire to thank the members of the committees who have so earnestly taken part in the activities of the last year. The Special Committee on State Regulations that was provided for at our meeting last year is deserving of particular mention. The members of this Committee have devoted much time and thought to the important subject of having a change made by Congress so that the state live stock sanitary requirements governing the movement of live stock to the individual state may not be questioned. The Association will be greatly interested in hearing the report of this Committee.

All of us who have been identified with the activities of this Association know of the valuable assistance given it by my good

friend Dr. Dyson, our Secretary and Treasurer. Through his ability and willingness to handle the details, finances, and practically everything connected with the management of the Association, Dr. Dyson has performed an unusually valuable service. We hope he can continue to carry on this important duty.

I thank you for your kind attention.

PRESIDENT WIGHT: Gentlemen, that concludes the morning session. Is there a motion to adjourn?

Upon motion regularly made, seconded and carried, the session adjourned at 11:45 a. m.

WEDNESDAY AFTERNOON, DECEMBER 3, 1930

The second session convened at 1:35 p. m., President Wight presiding.

PRESIDENT WIGHT: The afternoon session will please come to order.

This session, as you will note by your program, is devoted entirely to the abortion disease problem. The first paper to be presented on this subject will be given by Drs. W. E. Cotton and John M. Buck, Experiment Station of the Bureau of Animal Industry at Bethesda, Maryland. Dr. Cotton will read the paper. (Applause)

Dr. Cotton read the paper.

BUREAU OF ANIMAL INDUSTRY RESEARCHES ON INFECTIOUS ABORTION

By W. E. COTTON, Superintendent, and

J. M. BUCK, Assistant Superintendent,

*Experiment Station of the United States Bureau of Animal
Industry, Bethesda, Md.*

Nine years ago, the late Doctor E. C. Schroeder gave to this Association an account of some of the earlier work of the Bureau on abortion and the studies then in progress. We will briefly review the activities of the Bureau on this disease since that time and discuss more in detail investigations now in progress or recently completed.

The past few years have brought greatly increased interest in the abortion problem, especially by dairymen. This interest has not only been stimulated by the realization that the disease is spreading and enormous losses sustained but also by the discovery that *Bacterium abortus*, or *Brucella abortus*, as it is now often called, has a significance for human health, and that the milk of infected cows is not above suspicion as causing undulant fever in man. Confronted by such grave problems as the possibility of being responsible for sickness in man and loss of market for his product, the dairyman naturally becomes uneasy and is anxious that measures be taken to combat the evil, if such measures are available, and, if they are not, that strenuous efforts

be made to discover and make them available. The discovery of the etiological cause by Professor Bang, thirty-three years ago, and others that have followed, have thrown much light on what had been a very mysterious disease. These discoveries have made it possible to offer resistance to the spread of the malady and actually to eradicate it from many herds.

No one can better appreciate how difficult it is to add to our knowledge of this baffling disease than the investigator who has spent years in trying to solve some of its mysteries. Most experiments in connection with it are time-consuming, requiring in many instances years of sustained effort, each step requiring a large number of animal inoculations, bacteriological examinations and blood tests.

The report which Dr. Schroeder made nine years ago was in the nature of a progress report. The work on abortion has been continued since then from year to year as time and money were available. From 1921 to 1928, several lines of work that have added not a little to our knowledge and opened the way for other investigations have been carried on. These concern:

1. A study of *Bact. abortus* that attacks swine. It was shown that the swine strain causes lesions in guinea pigs different from those caused by the bovine strain, and that the former is much more virulent for these animals than the latter. It was further shown that there is a distinct difference in the behavior of the two strains toward swine and cattle, the swine strain failing to infect cattle by natural means and vice versa, though they could be infected by intravenous injection. The nature of abortion in swine was inquired into and it was found that boars were more frequently infected than bulls, and that they probably played a much greater role in infecting sows than did the bull in infecting cows, and contrary to what had been found in cattle it was not uncommon for the infection to be found in the ovaries. It was discovered also that infection might persist elsewhere than in the udders of sows for long periods. It was determined that the swine germ would persist in guinea pigs for two or more years, whereas the bovine would usually disappear within a year.

2. Methods that seemed most promising for controlling the disease in cattle were put in practice in several herds. Results of the trials of these methods showed it to be economically possible to control the disease in some herds and to eradicate it from others by blood-testing and the elimination or segregation of

reactors. It was shown also that this was difficult, if not impractical, in other herds in which the disease was particularly active and where measures to prevent the spread of infection could not be so strictly enforced. This work indicated: (1) that the elimination and segregation methods, while best where they could be economically employed, were not always practical, (2) that the slower method by use of sanitary measures, especially those that made use of the maternity stall, would probably yield good results in certain herds, and (3) that there was need for some method such as immunization in others in which the disease had gained a very firm foothold. These results led to renewed efforts to determine more definitely the value of modes of inducing artificial immunity, which have since received considerable attention and will be discussed later.

3. Investigations were made to determine whether the exposure of an infected herd of cattle, in which the disease was quiescent, to different strains of *Bact. abortus* than the one with which it was infected would lead to a lighting up of the disease, and at one time it was indicated that the exposure of such a herd to *Bact. abortus* of swine origin might have serious consequences. This latter, however, could not be proved by further trial and later experiments indicated that cattle were highly resistant to the swine type of the microorganism.

4. Since the swine strain of *Bact. abortus* seemed to have low pathogenicity for cattle, it was then thought that it might prove to be a satisfactory immunizing agent for them. It was therefore tried on both pregnant and non-pregnant cows, with the result that while it appeared to a marked degree to prevent pregnant cows from aborting, when subsequently exposed, it failed to induce a measurable degree of immunity in non-pregnant ones and, furthermore, had the very serious objection of becoming localized in the udders of some of the vaccinated animals, a feature that wholly prohibits its use because of the relation of this type of *Bact. abortus* to human infection. It should be said that this investigation was begun before it was generally believed that the disease had a significance for human health.

5. Preliminary studies on guinea pigs and two cows indicated that the conjunctiva might be a channel of infection. A very small quantity of infective material dropped into the eye accomplished as much as many times that quantity taken through the digestive tract. This work of late has been carried further and conclusive results obtained.

6. Studies looking to improving the agglutination test and of interpreting results were continued over a long period, and preliminary work, which endeavored to establish the relation between udder infection and agglutination titre, undertaken and carried to a point where it appeared that reactions in low titres (1:100 or less, as made by the Bureau) rarely indicate infection, whereas titres of 1:200 or more in over 80 per cent of cases do.

7. The use of an avirulent strain of *Bact. abortus* for the preparation of vaccine received attention. Preliminary experiments with guinea pigs indicated this to be an encouraging line of study. Trials on a limited number of cattle further indicated that it afforded considerable resistance to abortion if administered to pregnant animals but appeared to be useless when administered before conception.

The foregoing are the principal, though by no means the only, lines of investigation undertaken during this eight-year period.

In July, 1929, additional funds made it possible to undertake an expanded research program on abortion, not only at the Bureau's Experiment Station but in coöperation with several state universities and experiment stations, equipped to work on this disease. In taking up projects for coöperative study those that appeared to be most practical and for which facilities could best be provided were assigned to the several state stations, while the Bureau expanded some of its projects and undertook others as opportunity permitted.

The coöperative projects undertaken by the several state institutions are thirteen in number, as follows:

1. *Studies in the use of avirulent Bact. abortus as an immunizing agent:* The state institution engaged in this project had been working on the problem for several years and has obtained some encouraging results. The Bureau's Experiment Station is giving attention to a similar project but one in which a different strain of *Bact. abortus* is used, under somewhat different conditions. It is hoped that this work, possibly in conjunction with similar work being done at another state institution, will lead to the development of a useful and safe method of controlling the disease where more radical methods fail.

2. *Collection and study of Bact. abortus cultures:* This is a class of work that should greatly aid in elucidating the sources of human infection with *Bact. abortus* and the difference in virulence of different outbreaks of infectious abortion and possibly

supply information of value in dealing with the problem of immunity.

3. *A herd survey of reacting animals to determine the relation of the titre of reaction to udder infection:* This is a project to which the Bureau's Experiment Station has given considerable attention and still is doing so. The project involves the determination of the titre of blood reaction that denotes present infection, and the collection of data from many herds is necessary for conclusive results. The coöperating state institution has had several herds under observation for this purpose for more than a year and expects to add to this number soon.

4. *The determination of the best practical methods of limiting infection and reducing exposure in infected herds where more drastic means of control are impractical:* Two herds which are under carefully controlled management have already been in this work for over a year and it is expected to add several others to this in the near future.

5. *A study of the immunity and carrier problem in bovine infectious abortion:* This project concerns the value of the use of different strains of *Bact. abortus* as immunizing agents and the relation of vaccination to carriers of infection, but attacks it in a somewhat different manner than is done in Project 1.

6. *A study of the relative productivity of dairy cows infected with Bact. abortus compared with non-infected cows on the same farms:* For this purpose several large dairy herds are being kept under observation and separate records are being kept of productivity of the infected and non-infected animals in these herds.

7. *Breeding rabbits resistant to abortion:* This project is an endeavor to determine whether it is possible, through breeding, to increase the resistance of small, rapidly-multiplying animals to *Bact. abortus* and, if so, whether the knowledge so gained can not be applied to the breeding of cattle resistant to this disease. So much has been accomplished in breeding plants resistant to diseases that the hope has been entertained that something might be done in this direction with animals.

8. *Chemotherapy:* The desirability of gaining more accurate information as to the value of drugs and chemical agents in the treatment of infectious abortion is self-evident.

9. *Eliminating abortion by blood-testing and segregation of reactors:* This is a practical field experiment to determine what can be done, through the veterinarian, to eliminate the disease

by blood-testing and the segregation of reactors, and the most successful way of handling different kinds of herds. A number of herds are under observation and much information has already been collected.

10. *Studies of serological tests:* These are aimed at securing information that will make it possible to improve and standardize methods of detecting infected animals and lead to better interpretations of the agglutination test.

11. *A study of the final development in those cattle reacting to agglutination tests in low titre only:* In any campaign to control or eradicate the disease, based upon the blood test, there are sure to be many cattle that react in low titre only. Just what to do with these cattle is a puzzling question. Are they latent cases of infection that may at any time become active, or are they entirely free from infection but possess a considerable amount of resistance and, hence, more valuable than cows that are negative? Definite data on this point will be very helpful.

12. *The role of reinfection with Bact. abortus of abortion-reacting cows:* Information that this project should supply will throw much light on the immunity problem.

13. *The cause of low-percentage calf crops in range herds:* This project deals with deficient diets as factors in causing reduced breeding efficiency. A large amount of data as to percentage calf crop and many samples of grasses from the different ranges have already been collected and are being analyzed and correlated. It is hoped that analyses of these grasses, taken from many ranges, will throw more light on the problem of the relation between diet and abortion and breeding efficiency.

Work on the foregoing projects is well under way but most of them will require several years' sustained investigation before conclusive results can be obtained. A few experiments have already been completed and the results will soon be published.

It is felt that these coöperative projects, attacking so many phases of the abortion problem in widely different localities, will greatly advance our knowledge of abortion and point out additional means of combating the malady.

RECENT RESEARCHES OF THE BUREAU

One of the Bureau's independent investigations to be considered is that concerning modes of transmission. It is now generally believed that the digestive tract is the channel through which

the disease usually is acquired. The belief that there may be other channels of infection led the Bureau to undertake the preliminary work in connection with infection via the conjunctiva, which already has been mentioned, and to continue this work later on a larger scale. The investigations have now reached a point where it can be said with certainty that susceptible pregnant cattle can be readily infected, through the conjunctiva, by the use of amounts of infected material surprisingly small as compared to those required by ingestion. Two to four drops of a suspension of *Bact. abortus*, prepared from recently isolated cultures and of a density of approximately 20 times that of tube 1 of the McFarland nephelometer, deposited on the conjunctiva of a susceptible pregnant cow or heifer, rarely has failed to transmit the disease, and it is likely that much less than this would be sufficient as indicated by our earlier experiments. Up to the present time, 16 out of 17 trials of the method have resulted positively.

This method of inducing the disease has given such uniform results that it has been adopted as an exposure procedure in our immunizing experiments and has yielded more satisfactory results than we formerly derived from ingestion exposure. It is marked by a degree of precision unusual in experimental methods of exposure approaching those that are natural. Whether this avenue of invasion is of importance under conditions such as generally occur in infected herds is yet unknown and will likely be very difficult to determine. But it does not seem unreasonable to suggest that drops of infected material might be splashed into the eyes of an animal or that infection might be carried on particles of dust or by flies that congregate about the eyes of cows at times. That it is a reliable and accurate way of conferring the disease to animals experimentally there is no doubt.

Another channel of infection was suggested by the recent report of Hardy and his associates,¹ that they had succeeded in infecting guinea pigs with *Bact. abortus* through the unbroken skin. Hardy suggested this as a possible route of infection for man and possibly for cattle. The experiments of the Bureau on this mode of infection have been pursued with the view to determining whether the disease can be imparted through the slightly injured skin as well as through the uninjured. The results with the latter have been somewhat less uniform than with the former, and to a slight degree indefinite. Four of seven pregnant heifers which were subjected to *Bact. abortus* exposure through the unbroken skin acquired the disease. Three of the four animals received a single

application of a few cubic centimeters of *Bact. abortus* suspension to the skin of the gluteal region. The fourth received a second application. In each case the suspension was applied to but a single area about six inches in diameter.

The precautions taken to prevent the operation of other channels than the one under investigation consisted in the confining of the animals in stalls so constructed as to prevent, as far as possible, the passage of bedding or hay between the mangers and the portions of the stalls behind the mangers. The manner of construction also made it impossible for the animals to turn heads laterally sufficiently far to reach other portions of their bodies. Cloths used for covering the areas of the skin to which the *Bact. abortus* suspensions were applied were held in place for several weeks by the use of adhesive tape. While it is possible that these measures did not eliminate all other channels of infection, the results strongly suggest that *Bact. abortus* is capable of infecting cattle through the unbroken skin.

Two other pregnant heifers that were handled in a similar manner, except that the skin areas to which the *Bact. abortus* suspension were applied were first shaved and scraped with a scalpel until serum oozed out, promptly acquired the disease. In the event further investigations with reference to the skin as an avenue of invasion are confirmatory of these results, then we are still confronted, as in conjunctival exposure, with the problem of determining its probable significance under conditions that prevail in infected herds. It is not difficult, however, to conceive of a cow having infected material splashed or smeared on her skin and remaining there possibly protected from drying and light by a layer of manure, or of the infection entering through small abrasions.

INTERCOMMUNICABILITY OF BOVINE AND PORCINE ABORTION

The earlier work of the Bureau, already referred to, showed that the swine type of *Bact. abortus* would produce abortion in cattle through intravenous injection. However, we were then unable to show by repeated trials that cattle could be infected by swine strains, or swine by the cattle strains, through ingestion. Within the last few years the isolation of the swine strain of *Bact. abortus* from cattle has been reported in a few instances. The manner of these infections becomes a matter of considerable importance, since the swine strain of *Bact. abortus* appears to be much more pathogenic for man than the bovine strain. It was

suspected that a swine strain had inadvertently been used in the preparation of abortion vaccine. If much of such a product was used, it might account for a considerable number of cows being infected with the swine strain, for it has been shown by the Bureau that when this strain is used on either pregnant or open cows it may invade their udders and cause them to remain infected for a long time. In our examination of the vaccine on the market, less than three years ago, one sample was proved to contain *Bact. abortus* of the swine type. This lot of vaccine was at once removed from the market but we have no means of knowing but what others of like character had been used. Though contaminated vaccine may have accounted for some of the cases of abortion due to swine infection reported in cattle, it is feared that it may not account for all of them. It is possible that while the swine may not be transferable to cattle through ingestion, there may be some other mode of transfer that occurs in nature. Efforts have therefore been made to infect through the more positive conjunctival method. For this purpose two pregnant, non-reacting heifers were exposed in the latter part of 1929 to the sixth transfer of a typical swine strain, by depositing four drops of a dense suspension of this strain on the conjunctiva and in addition one of the heifers received, through ingestion, the growth of the same porcine strain that developed in 48 hours on two agar slants. The heifer that received the eye exposure alone expelled a dead fetus of nearly full-time development. *Bact. abortus* of the swine type was isolated both from her fetus and colostrum. The heifer that received both conjunctival and ingestion exposure gave birth to a vigorous calf. *Bact. abortus* could be isolated from neither her placenta nor colostrum despite the fact that at time of parturition her blood serum reacted to the agglutination test in a titre of 1:200.

A third heifer which was subjected to conjunctival exposure at a somewhat later date, when use was made of the thirteenth transfer of the same swine strain, produced a vigorous calf although *Bact. abortus* of the swine type was readily isolated from her placenta and colostrum.

The fact that two or three pregnant heifers that were exposed by a method which has been proved by our investigations to be very severe, having caused with the bovine strain abortion in 16 out of 17 cattle, produced normal calves even though one of them showed infection in placenta and colostrum, indicates that the swine type of *Bact. abortus* is less pathogenic for cattle than the

bovine type. These results, coupled with the repeated failure of the Experiment Station in years past to infect cows with the swine type of the microorganism by ingestion, and the frequency with which it reached the udder when injected subcutaneously as vaccine, leads to the belief that the swine strain is only mildly infectious or pathogenic for cattle through natural exposure, but the possibility exists that, through some unusual form of exposure, it may invade the udder and at times the uterus, and occasionally even cause an abortion.

Efforts to induce abortions in pregnant sows or to cause marked persistent agglutination reactions, by exposure to bovine strains of *Bact. abortus* or through the feeding of infected bovine fetuses, have for the most part failed.

From the use of nine sows in these experiments, it has been possible in no instance, at time of farrowing, to isolate *Bact. abortus* from placental emulsions through guinea-pig inoculations. While all of the sows, following exposure to *Bact. abortus* of the bovine type, developed reactions in titres of from 1:100 to 1:1000, these reactions in most cases were not sustained at such levels for long. One sow, however, that had been injected intravenously with a recently isolated bovine strain, continued to react in a titre of 1:1000 or higher for more than a year; and another sow, receiving the same kind of exposure, showed the presence of *Bact. abortus* of the bovine type in an emulsion made from her uterus and ovaries when killed a year later.

While each of two sows of the group gave birth to one dead pig along with fair-sized litters that seemed to have normal vigor, and another sow farrowed two partially decomposed pigs out of a litter of seven, failure was experienced in all three cases in tracing the responsibility for the deaths to the abortion germ. Milk from infected cows has been fed to pregnant sows but so far without infecting them.

Although the foregoing investigations have not been carried sufficiently far to warrant the conclusion that all bovine strains of *Bact. abortus* are virtually harmless for swine through natural exposure, they, and results of the Station's earlier investigations, lead to the belief that bovine abortion plays a very small if any part in the swine-abortion problem and this is supported by the absence of swine abortion on many farms on which there are badly infected herds of cattle.

It appears possible and indeed likely that under unusual con-

ditions the udders of cows may become infected with the swine type and that the udders and possibly other organs of swine, since abortion disease seems to invade more organs in swine than in cattle, may under similar conditions be invaded with the bovine type, but that the diseases in the two species of animals have little natural etiological significance for each other.

Studies to determine the distribution of *Bact. abortus* in the tissues of swine have been started as well as others to determine the ability of this type of the bacterium to exist under certain special conditions.

VACCINATION

Vaccination, though an unpopular subject with many, is, nevertheless, one that cannot lightly be dismissed until it has definitely proved to be incapable of being made to serve a useful purpose with safety to man and animals, or is shown to be a useful instrument with which to attack the abortion problem, a problem so great and with so many fronts that all the weapons that can be made available are needed for success in combating it.

It is not our purpose to belittle the efforts at eradication by blood tests, elimination and segregation of reactors and sanitary measures. Such methods, where they can economically be used, are better by far than any vaccination program. But there are very many herds in which even a moderately efficient vaccine, if reasonably safe, could be used to great advantage. It is not even difficult to picture to oneself ways by which vaccination might even be of great service in an eradication campaign by checking the progress of virulent outbreaks until other means of eliminating the disease could be used. This, of course, anticipates a decided improvement in our interpretations of the agglutination test by which all low-reacting animals would not be regarded as infected. In view of the great difference of opinion that exists regarding the value of vaccine, and the need for every weapon that can be made available to combat infectious abortion, it was considered highly desirable and, in fact, necessary that we weigh its good and evil qualities by carefully controlled experiments, and to determine whether it can be so improved as to be made both efficient and so safe that it can not be accused of causing human disease or of setting up centers of infection in animals.

To make certain, as far as possible, of the accuracy of results, the experiments have been carefully controlled by unvaccinated animals and by thousands of guinea-pig inoculations, cultures and

agglutination tests, things that are difficult if not impossible in field tests, but which are vital to the reliability of results.

In much of the work on vaccination, little attention has been given to the virulence of cultures used in the preparation of vaccines. In many cases a number of strains were used, some of which had been recently isolated and others had been under cultivation for a long time. Some have used a mixture of old strains, some a mixture of those recently isolated and some single strains more or less virulent. There has likewise been a great variation in the use of the vaccine, and lack of sufficient controls in many field trials have made it next to impossible to measure results. However, well-controlled experiments have shown that the use of a living, fairly virulent vaccine offers encouragement. Not only have heifers in many instances, when vaccinated previous to conception, manifested a marked degree of resistance to *Bact. abortus* when subsequently bred, but their agglutination reactions, although rendered most pronounced for a time, have after several months become markedly reduced, or have entirely disappeared. The complete disappearance of *Bact. abortus* from their bodies was, furthermore, indicated by bacteriological studies. Vaccination, if always followed by such results, might be considered almost ideal. Unfortunately, this has not been the case. In some instances vaccines have caused the udders of the treated unbred animals to become infected, thus becoming active or potential disseminators of *Bact. abortus* in their milk for long periods, a condition that can be regarded only as highly objectionable in view of the undulant fever situation in man. Furthermore, vaccination has by no means always conferred a dependable immunity. It has been with a view to determining whether the limitations and objectionable features of preventive vaccination may not, at least in part, be overcome, that experiments dealing with this phase of the problem have been conducted.

CALFHOOD VACCINATION

Studies of vaccination of young animals were begun in 1925. Sixteen calves, of which eleven were principals and five controls, were placed in the experiment. Three different lots of vaccine, representing different degrees of virulence, were used. Five calves received vaccine prepared with three *Bact. abortus* strains eight years under artificial cultivation. Three received vaccine prepared from a *Bact. abortus* strain propagated one and one-half

years, and three received vaccine prepared from the third transfer of a single *Bact. abortus* strain. The calves received but one treatment.

The animals were carried through their first pregnancies, during which they were exposed to *Bact. abortus* by ingestion. The eleven principals gave birth to eleven vigorous calves, whereas three of the five controls acquired the disease and aborted. The most virulent vaccine seemed to establish itself in the udder of one of the animals, and another animal, which received the least virulent vaccine, failed to resist entirely the exposure to which it was subjected. *Bact. abortus* was isolated from its udder and uterus even though its calf was vigorous.

All of the principals were carried through a second gestation, during which they and five fresh controls were exposed through ingestion to *Bact. abortus*. One of the controls acquired the disease and aborted, and another acquired the disease and gave birth to a weak calf. The eleven principals produced ten seemingly normal calves. The remaining one aborted but, as far as could be determined, from a cause other than *Bact. abortus*.

While the number of animals used in this experiment was too small for conclusive results, the experiment yielded sufficient encouragement to justify inaugurating an experiment along similar lines in which use is being made of 35 animals. In this latter work, which has recently been started, the calves were vaccinated at a somewhat earlier age and the vaccine was prepared from strains of *Bact. abortus* of moderate virulence only.

Calfhood vaccination, if successful, would appear to make it possible to eliminate the principal objectionable feature which attends vaccination of adult animals. In the event an occasional case of udder infection is induced, it could be detected by the blood test and the animal eliminated long before reaching sexual maturity.

USE OF AN AVIRULENT STRAIN DURING PREGNANCY

The idea of using *Bact. abortus* strains of low virulence or those that are avirulent for immunizing purposes is not a new one but has been somewhat extensively studied for several years by Huddleson² with some degree of success. Similar studies, but with a different strain of *Bact. abortus*, also were made by the Bureau's Experiment Station, as has already been mentioned. These studies having offered some encouragement, other experiments were inaugurated by the Bureau in the summer of 1929.

In one of these experiments the vaccine was prepared from the same strain of *Bact. abortus* used in the Bureau's earlier experiments. When used in the present one it failed to produce lesions in guinea pigs when injected even in large doses, and also failed to produce any demonstrable disease when injected intravenously into pregnant cows. While the strain seemed to have lost its virulence, its sensitiveness from an agglutination standpoint, nevertheless, remains unimpaired. In previous experiments vaccine prepared from this strain appeared to induce little if any immunity when administered before conception, but appeared to afford considerable protection against the disease if given to pregnant animals.

Of the 19 pregnant cows and heifers used in the experiment under discussion, 10 were principals and 9 controls. Seven of the 10 principals received a single subcutaneous injection of the vaccine. Three of the seven received 10 cc each and four 20 cc each. The vaccine had a density of about 10 times that of tube 1 of the McFarland nephelometer. The remaining three animals received two 10-cc doses of the vaccine two weeks apart.

The 10 vaccinated animals and the 9 controls were exposed to *Bact. abortus* in one to two months after the former were vaccinated. Some variation in the time of exposure was necessitated by the fact that the principals were not all vaccinated on the same date. Use was made of both conjunctival and ingestion exposure to recently isolated strains of *Bact. abortus*, for up to this time we were not sure of the reliability of the conjunctival method of exposure. Briefly, the outcome of the experiment was as follows:

Four of the 20 vaccinated animals gave birth to vigorous calves, and as far as could be determined their uteri and colostrum were free from *Bact. abortus*. Three produced weak calves, one of which died soon after birth. *Bact. abortus* was isolated from both uteri and colostrum from these, and three aborted and likewise had *Bact. abortus*-infected uteri and colostrum. Of the 9 controls 7 aborted. One gave birth to a weak calf which failed to live, and one failed to contract the disease and produced a vigorous calf. The presence of *Bact. abortus* was demonstrated in the uteri and colostrum of all of the controls, except the one which calved normally.

The immunity in this group of animals, treated with avirulent vaccine, while far from perfect, nevertheless afforded some protection, since 40 per cent of the treated animals completely

resisted an exposure to *Bact. abortus* that was resisted by only about 9 per cent of the controls. Further studies of this phase of vaccination are being made.

COMPARATIVE STUDIES OF VACCINE OF DIFFERENT DEGREES OF VIRULENCE

Since the Bureau's previous studies indicated that a vaccine prepared from a strain of *Bact. abortus* avirulent for both guinea pigs and pregnant cows in large doses did not induce a measurable immunity when administered to unbred cows, whereas recently isolated strains did but unfortunately infected the udders of some of them and, furthermore, as shown by Hart and Traum,³ may cause a large proportion of lactating cows at least temporarily to eliminate the vaccine microorganism in their milk, it was believed desirable to search for strains in virulence somewhere between these extremes that would confer immunity without infecting the udder. For this purpose an experiment in which 36 cattle were used was inaugurated. These were divided into four groups. Each group consisted of six unbred heifers and three unbred cows. In one group a vaccine was used that was prepared from a strain of *Bact. abortus* designated "11," which had been on artificial culture media since 1917 and was but slightly pathogenic for guinea pigs.

A second group received a vaccine prepared from a strain of *Bact. abortus* designated "19," which had been under artificial cultivation since 1923 and was somewhat more pathogenic for guinea pigs than strain 11.

The third group was given a vaccine prepared from the third transfer of a strain of *Bact. abortus* designated "484," which was decidedly pathogenic for guinea pigs. The vaccines therefore represented three different degrees of virulence.

The fourth group of animals was reserved as controls.

One cow in each group treated received the vaccine intradermically in .25-cc amounts. All the others received it subcutaneously; half of the animals in each group received a single dose of 10 cc of vaccine, having a density of about 10 times that of tube 1 of the McFarland nephelometer and the other half 20 cc.

Samples of milk were procured periodically from the vaccinated cows, from the time they were vaccinated until they were exposed, and tested by guinea-pig inoculations for *Bact. abortus*. Some unexpected results followed from the milk inoculations from the

cows that had been vaccinated intradermically. All three types of the vaccine appeared to have invaded the udder. In the case of strain 11, the weakest strain, infection of the udder could not be determined by any lesions that were produced in guinea pigs, but rather by the observation that milk samples obtained from the strain-11-vaccinated animal on two different dates caused agglutination reactions in them of 1:100 to 1:200 titres. The sojourn of the attenuated vaccine in the udder appeared to be brief, because only two out of numerous lots of guinea pigs, which were inoculated with milk from this animal, acquired reactions. On the contrary, the milk of the two cows which received intradermic injections of strains 19 and 484, the moderately attenuated and virulent strains, infected guinea pigs with regularity. Udder infection was induced also in the two other cows of the group which received the most virulent (484) strain subcutaneously, but strains 11 and 19, as far as could be determined, failed to infect, except when given intradermically.

The results of these few cases indicate that, for the udder, .25 cc injected into the skin is more infective than 40 times this amount introduced beneath it, and suggests that the skin may be a channel of infection of considerable importance.

Conjunctival exposure alone was used to determine the degree of immunity the vaccines afforded in this experiment.

Two heifers and one cow in the experiment failed to conceive, and two animals have been lost through death. A number have yet to complete their gestations, so that only partial results are now available.

Six out of seven controls on which data are complete have aborted, and one produced a seemingly normal calf. *Bact. abortus* was isolated from the uteri and colostrum of all seven animals and retention of placenta occurred in four.

Fifteen of the vaccinated animals have produced 15 apparently normal calves. Another cow gave birth to an undersized calf that, although weak, survived. In none of these 16 animals was the placenta retained. *Bact. abortus* was isolated from the uterus and colostrum of one of the three cows which received the vaccine intradermically and from the colostrum of a second. *Bact. abortus* was isolated also from the uterus and colostrum of one of the animals vaccinated subcutaneously with strain 11, the weakest strain, and from the uterus alone of two vaccinated in the same manner with strain 19, the one of moderate virulence, and

from the uterus and colostrum of one subcutaneously vaccinated with the most virulent (484) strain.

The uteri and colostrum of nine other vaccinated animals on which data are now complete were free from infection.

It seems evident from the results already obtained that highly virulent strains of *Bact. abortus* are decidedly objectionable for use in the preparation of vaccine, even if intended for the vaccination of unbred animals, because of the danger of thus implanting the infection in the udder. On the other hand, the results thus far derived from the subcutaneous administration of the two attenuated strains are encouraging, for the animals into which they have been injected have not only produced vigorous calves under conditions of *Bact. abortus* exposure that caused controls to abort with regularity, but in a manner that gives some promise of overcoming one of the most objectionable features in connection with vaccination, namely, the establishment of vaccine infection in the udder.

All of the animals in the experiment were frequently blood tested and, through this, much information, relative to the time relation between infection and the appearance of agglutinins in the blood, has been collected. Furthermore, repeated milk tests have been made to determine the permanency of udder infection when it occurred in the vaccinated animals.

STUDIES IN CHEMOTHERAPY

While the use of medicinal agents for the treatment of infectious abortion has offered very little encouragement, hope is entertained that some agent of this kind may eventually be found that will at least drive the infection from the udder and thus make it possible to free many otherwise useful animals from the taint of *Bact. abortus* infection.

As opportunities have presented themselves, the Bureau has subjected different drugs and chemical agents to critical tests on infected cows with the view to ascertaining their efficiency in overcoming *Bact. abortus* in the body of the animal, especially the udder. Up to the present time 26 *Bact. abortus*-udder-infected cows have been used in determining the virtue in this respect of several medicinal agents, which seemed to offer the most promise. These included butyl chlorid, chloroform, thionin, neoarsphenamine, neutral acriflavine, sodium cacodylate and pyridium.

Thionin has been administered both intravenously and through the mouth; neoarsphenamine, acriflavine and sodium cacodylate

intravenously only; and pyridium and butyl chlorid through the mouth in capsules or drenches. Repeated inflations of the udder have been practiced in the case of chloroform vapor. Seldom have less than ten weekly treatments been given of those substances administered intravenously. Daily and even thrice-daily doses of the substances have in many cases been given, when oral administrations have been practiced, and the treatments have often been continued under these conditions for from two to three weeks. The results of the treatments have been arrived at by tests of the infectivity of the milk for guinea pigs, both before and following the treatments.

The investigations of the therapeutic value of the medicinal agents thus far have offered practically no encouragement, but, nevertheless, they will not be abandoned.

STUDIES IN COMBATING ABORTION BY BLOOD TESTING AND ELIMINATION AND SEGREGATION OF REACTORS

The Bureau for a number of years has been endeavoring to determine the efficacy and practicability of methods of control and eradication, based on the blood test and elimination or segregation of reacting animals. These methods have been tried on a considerable number of both government and privately owned herds. The results obtained from the work have in many instances been highly successful and have left little reason for doubt as to their usefulness. However, results have not always been so encouraging. Pursuance of such programs has in some cases subjected owners to much inconvenience and expense without affording material benefit.

Failure of the serological tests to differentiate accurately between immunity and infection, the expense and trouble incurred and the too frequent reappearance of the disease in the free units when segregation is practiced, are factors to no small degree detrimental to the success of the elimination and segregation methods. While much encouragement has been derived from the control and eradication efforts, based on blood tests which have been made, our recent as well as our earlier investigations of this subject have shown that, while very helpful, these methods are not always practical or satisfactory.

ABORTIONS DUE TO CAUSES OTHER THAN *BACT. ABORTUS*

Some attention has been given to abortion in herds from which Bang's disease had been eradicated, but which continued to experience abortion losses. Abortions not caused by *Bact. abortus*

are sometimes very discouraging to stock-owners who, after having freed their herds from Bang's disease, at considerable trouble and expense, find that their abortion losses are nearly as great as before their eradication programs were begun. One herd in particular deserves mention. This consisted of over 200 purebred Holsteins. It was freed from infectious abortion several years ago through the segregation and final elimination of reactors to the blood test, and has since remained free from the disease, as shown by repeated blood tests. Following the eradication of the disease the abortion rate for the years 1924, 1925 and 1926 averaged between 5 and 6 per cent; in 1927 it rose to nearly 12 per cent; in 1928 to more than 13 per cent; and in 1929 it was over 10 per cent. The abortion rate for 10½ months of the present year is less than 6 per cent, which indicates that the outbreak has about subsided. Studies of the products of the abortions over this period, both by cultural methods and guinea-pig inoculations, gave little information as to the responsible factor or factors, except to exclude *Bact. abortus*.

Some deficiency in diet was suggested as a possible cause of the abortions, but no evidence was forthcoming that tended to prove this. The cows were fed a very liberal and varied diet which appeared to supply all the needed minerals and vitamins as well as the proper amounts of carbohydrates, proteins and fat. At least experts were unable to suggest improvement in the ration and, besides, there had been no apparent change made in it for a long time, and it was the same as was used when the herd had a low abortion rate. It may be of interest to those who believe that the feeding of brown sugar or molasses supplies a reproductive vitamin that helps to prevent abortion that a large share of the carbohydrates in the ration fed this herd was supplied by West Indian molasses.

The investigation of serious outbreaks of abortion in Bang's disease-free herds deserves careful consideration. It is realized that we can probably never eliminate all abortion but there must be some determinable and likely preventable cause for an annual abortion rate of from 10 to 13 per cent over a period of three years. It was planned to have a coöperative project dealing with this problem with one of the state experiment stations, but because of circumstances over which the Bureau had no control this has not yet been arranged. It is hoped that such a project may be a part of next year's program.

We have tried to give you a brief outline of the principal projects on abortion that have engaged or are engaging the attention of the Bureau. There are others of less importance on which work has also been done, but time does not permit of their discussion. However, it is believed that enough has been presented to show that the Bureau recognizes the seriousness of the abortion situation and is expanding its investigations as fast as trained men and facilities can be provided and efforts directed into channels that promise to yield worthwhile results.

Sufficient funds are needed to carry on the program that has been inaugurated and to expand it as fast as new promising lines of investigation develop. A gradual increase in funds from year to year, as they can be efficiently used, is much to be preferred to the appropriation of large sums before adequate plans have been developed to put them to work to advantage.

REFERENCES

- ¹Hardy, A. V., Hudson, M. G., and Jordan, C. F.: The skin as a portal of entry in *B. melitensis* infection. Jour. Inf. Dis., xiv (1929), 4, pp. 271-282.
²Huddleson, I. Forest: Studies on a non-virulent living culture of *Bact. abortus* towards protective vaccination against bovine infectious abortion (Bang's abortion disease). Mich. Agr. Exp. Sta. Tech. Bul. 65 (1924).
³Hart, G. H., and Traum, J.: The relation of the subcutaneous administration of living *Bact. abortus* to the immunity and carrier problem of bovine infectious abortion. Univ. Calif. Tech. Paper 19.

PRESIDENT WIGHT: The next speaker is a gentleman who has come a long way to appear before us this afternoon. He is a physician. I take great pleasure at this time in introducing Dr. Richard A. Kern, of the University of Pennsylvania, Philadelphia, Pennsylvania. (Applause)

Dr. Kern read his paper.

UNDULANT FEVER FROM A PHYSICIAN'S STANDPOINT

By RICHARD A. KERN, Philadelphia, Pa.

Assistant Professor of Medicine, School of Medicine,
University of Pennsylvania

For centuries there has prevailed on the shores of the Mediterranean a disease with prolonged and recurrent fever, the wave-like course of which gained for it the name "undulant fever," while it was also called Malta fever because of its prevalence in that island. There it was that Bruce, in 1886, described the causative organism which he called *Micrococcus melitensis*. In 1897, Wright and Semple showed that the disease could be diagnosed by a serum agglutination test. But the mode of transmission remained unknown and the Maltese garrison continued to have the unsavory reputation of the unhealthiest in the

British Empire. This, finally, led to the work of a British Admiralty Commission which, in 1905, found that the germ was present in the milk and blood of apparently healthy goats and that the disease was transmitted to man by the drinking of the infected milk. By the avoiding of goats' milk, Malta Fever was eradicated in the garrison of Malta. But civilians have continued to drink raw goats' milk and Malta fever has continued to be an important health problem, not only along the Mediterranean, but wherever the goat-raising industry has spread, including the West Indies, Mexico and our own southwestern states.

If we look up "Malta fever" in a text-book on Tropical Medicine, we find it defined as a "specific infection with fever of an irregular course and indefinite duration." Six to fourteen days after drinking infected milk, the patient usually develops an illness with fever, sweats, chills and vague pains; an illness that may last a few days or may last three years; that may simulate a surprising number of diseases, such as malaria, typhoid fever, inflammatory rheumatism and influenza. The true diagnosis is eventually arrived at by doing the specific agglutination test. Bassett-Smith¹ has said:

Malta fever, because of its variety of forms, is seldom recognized in its early stages in the countries in which it is known to be common; most of the patients are treated for something else at first.

For years there has been known a type of infectious abortion occurring in cattle, and due to a specific microörganism described by Bang, in 1897, under the name *Bacillus abortus*, a disease that has proved a serious economic problem in the cattle industry, a disease with the manifestations of which you are more familiar than I, and of whose great prevalence you are fully aware.

AN IMPORTANT DISCOVERY

In 1918, Alice Evans² made what is one of the most important bacteriologic discoveries of the century when she showed that the *Micrococcus melitensis* of Bruce and the *Bacillus abortus* of Bang were so similar as to be only varieties of the same species, and predicted that the abortus organism, like its Malta fever twin, would be found pathogenic for man.

Six years later, in 1924, Keefer³ reported the first proven case of abortus infection in man. In 1928, I was able to find only thirty-six reported cases, including two of my own.⁴ Many expressed the opinion that the abortus germ was probably not very infectious for man and probably of little importance in human medicine. However, at that time I pointed out (1) that most

cases had been reported by laboratory workers or those with experience in tropical medicine, (2) that the reported cases were widespread throughout the country, and (3) that the clinical picture of Bang's disease in man is just as varied as that of Malta fever. If now, Malta fever, as Bassett-Smith has said, is seldom recognized in its early stages in countries in which the disease is known to exist, how much more likely is human abortus infection to be overlooked in this country where most physicians have never heard of it? And I ventured to predict that a much greater incidence of the disease would be found than was suspected.

Two years later, Simpson⁵ was able to collect reports of 2,365 cases and from every state of the Union. This year, in the Public Health Section of the League of Nations, undulant fever was called the most important public health problem in the world today.⁶

Two questions are uppermost: How infectious is the abortus germ for human beings and how is the disease transmitted to man? Unfortunately, our knowledge on both subjects is still incomplete and controversial.

THREE STRAINS OF BRUCELLA

There is, in the first place, the matter of the different strains of Brucella; as many as seven have been described. At least three are generally accepted: the goat strain of tropical Malta fever, and the bovine and hog strains of abortion disease. Each is pathogenic for all the animal hosts and is transmissible from one host to the other. This at first led to the claim on the part of Europeans that all our cases of undulant fever were due to goat strains which had infected cattle and from cattle had passed to man. This is certainly not the case, except possibly in the Southwest, for the goat population in the Northeast is negligible, yet undulant fever is quite as frequent there as anywhere. The infectiousness for man of the abortus germs has since then been amply proven.

Some claim, however, that the majority of human cases, possibly all, are due to hog strains alone, which have infected man directly or by way of cattle. Hardy points out the high incidence of undulant fever in Iowa (363 cases) and connects this with the 10,500,000 hog population of the State. Yet New York, with far under a million hogs, has reported 213 cases of undulant fever. It is undoubtedly true that hog strains are distinctly more in-

fectious for experiment animals than are bovine strains; the same is probably true for man. In hog-raising regions, human infection probably arises largely from that source. But in the East, where hogs, and consequently hog infections, are far fewer than in the Middle West, human undulant fever is just as common, and in almost every case cattle have been the source of infection. Some of the germs have been of the hog strain, others bovine (the distinction between the two is by no means easy or certain). But whether one or the other, the practical problem with us in the East is primarily a cattle problem.

GOAT STRAIN MOST PATHOGENIC FOR MAN

It is true that the abortus germ is not nearly so pathogenic for man as the goat strain. The latter will cause a high percentage of infection among those who drink infected goats' milk. But there are other factors besides pathogenicity which influence the chance of infection from cows' milk. The number of germs in the milk of an infected cow varies enormously from time to time, from 500 to many millions per cubic centimeter; usually the figure is low and only occasionally does it rise high. Not all the cows of a herd are necessarily infected, and only a few of these may be eliminating the germs in large numbers at any given time. The pooled milk of a herd, through dilution, will have a low count and is therefore less dangerous. It is significant that many human infections arise through drinking the milk of a single cow. Atwood⁷ reported six human cases occurring in a single family that were contracted by drinking the milk of a single heavily infected cow.

MODE OF TRANSMISSION

How does man get the infection? In the first place, infection takes place by direct contact with infected animals, or their carcasses, or the products of abortion. Many cases, therefore, have been found among farmers, butchers, packing-house workers and veterinarians. This group accounts for the high percentage of affected males in most statistics. The infection is probably carried from hand to mouth, but it may possibly pass through the skin, as shown experimentally by Hardy⁸ in guinea pigs; or, as Dr. Cotton has just reported for animals, infection in man might occur by way of the conjunctiva.

Then there is a small group of cases among laboratory workers. All the organisms of this group have been found particularly dangerous to handle. Over the door of the Pasteur Malta Fever

Institute in Tunis are the words, "Enter here at your own risk." In Washington, of six Public Health Service workers assigned to this problem, five, including Alice Evans, have contracted undulant fever.

Drinking of raw infected milk is also an undoubted means of infection. Raw milk is used on farms. It is also extensively used in small towns which are supplied by small nearby dairies. Here raw milk is the only possible source of infection and in such groups the two sexes are equally affected. It is this group which offers the most convincing proof of the milk-borne nature of the infection, for in this group no other contact with infection can be traced. I have been asked by some extreme skeptics who refuse to admit the possibility of milk infection, whether I could rule out contact with infected raw meat as purchased in a butcher shop. To this there is a convincing answer: If infected meat were the source of infection, then those who handle it in the household, that is, the women, should constitute an overwhelming majority of the cases.

PASTEURIZED MILK NOT A FACTOR

In large cities, with their supply of pasteurized milk, undulant fever is rare. Cases found there have usually come from the country for diagnosis and treatment. *It is a significant fact that no case of undulant fever has ever been traced to pasteurized milk.* All strains of the organism are killed at 140 degrees F. for 20 minutes.

One point is as yet without adequate explanation: the comparatively small number of cases of undulant fever among the greatest consumers of raw milk—children. Some perhaps are overlooked. It is a significant fact, however, that calves fed on infected milk do not develop the disease; not until they are nearly mature does this occur. Possibly the human young are similarly immune.

Other dairy products have not been found a source of infection. Carpenter and Boak⁹ found no organisms in 17 butter and 82 cheese samples.

So far I have knowledge of only a single case of transmission of the infection from one human being to another: a case mentioned in the *Journal of the American Medical Association*. A gynecologist became infected after attending a woman who had aborted as a result of infection with this organism.

Clinical data: Turning now to clinical data, an important point is the occurrence of the overwhelming number of cases—ninety per cent—in small towns or in the country. The importance of this disease as a rural health problem is obvious.

Symptoms: As for the symptoms of the disease, we must state at the outset that there is no characteristic clinical picture. Like its twin, Malta fever of the tropics, undulant fever is an infection with an irregular course and an indefinite duration. This extreme variability and the simulation of half a dozen diseases account for the failure to recognize many cases. We cannot diagnose the condition from the symptoms alone; this is accomplished only by first realizing that the disease exists, and then by routinely using the proper laboratory tests in all undiagnosed fevers.

The onset in three-fourths of the cases is gradual and vague, with a daily increasing fever, at times chilliness and sweats, vague aches and pains and loss of appetite. At times, however, the beginning is sudden, with chill and fever.

After the onset, some of the patients get rapidly worse and seek medical aid. Others continue at their work for weeks and months, and do not feel nearly so ill as their appearance would suggest.

Fever is the only universal symptom, but there is nothing characteristic about it. It may be sustained for weeks on end, as in typhoid, or it may be up and down, as in tuberculosis. There may be clean-cut wave-like accessions and remissions, *i. e.*, undulant, but not over a third of cases fall in this group. Drenching sweats are the next most common symptom, and they tend to alternate with chills, as in malaria. Many have headache and insomnia, but delirium is rare. Painful swollen joints that simulate inflammatory rheumatism are present in one-sixth of the cases. There is loss of appetite, and, in the long-drawn-out cases, emaciation and anemia. In a few instances there have been observed pleurisy, endocarditis and intestinal ulceration; orchitis and seminal vesiculitis in men and mastitis and abortion in women.

The duration may be from a few days to several years. Probably the mildest infections have such minor symptoms that they are overlooked. So for instance, Huddleson and Johnson¹⁰ examined the sera of 49 veterinarians: 28 gave positive reactions in dilutions of 1:50, some as high as 1:500, yet in only 3 was a history of illness obtained. Other mild cases are diagnosed

influenza. Only when an illness drags on for weeks is the true state of affairs suspected.

The mortality statistics are improving as larger numbers of cases, especially milder cases, are reported, so that the number of deaths is now between one and two per cent.

Physical examination is largely negative beyond pallor, emaciation, a slightly enlarged spleen in one-third of the cases, painful joints in one-sixth, and in ten per cent a rash that is not typical.

The blood usually shows a low white-cell count and at times an anemia. In 50 per cent of the cases the germ can be cultured from the blood; at times it is found in the urine, and occasionally in the stools. Agglutination tests are usually positive quite early, and in high dilutions, but in rare instances they have been negative in cases proven by blood culture.

The diagnosis depends on the finding of the germ in blood or urine, or on a positive agglutination test. The essential thing is that the doctor should realize that the disease exists. The large number of case reports in the last year is due primarily to the spreading among doctors of information about the disease. The largest number of cases (363) has been reported in Iowa, not merely because of its ten million hog population, but because the State Health Department has staged the best publicity campaign. The adjoining state of Nebraska has not been so active, and in spite of its not inconsiderable number of hogs, has reported only 9 cases. It is scarcely likely that the state boundary prevents infection.

Treatment can be dismissed quite briefly. There is no specific. The use of vaccines and of convalescent serum has apparently been of value in some cases and offers some promise. The intravenous injection of certain antiseptics, such as mercurochrome, has occasionally been helpful, but far more often has failed. For the most part the treatment is symptomatic.

The chief concern today is prophylaxis. From the standpoint of the individual this might seem easy: the use of pasteurized milk and the avoidance of contact with infected animals. But from the standpoint of public health the only real prophylaxis is that which cleans up the source of infection, and here the problem assumes vast proportions. Bang disease is enormously prevalent. Its control will require a campaign as thorough and sustained as that against tuberculosis, a campaign that will demand for its successful completion the wise council, the intelligent coöperation

and the combined efforts of dairymen, the veterinary profession, and the guardians of the public health.

May I summarize briefly:

- (1) Bang disease is widely prevalent in cattle and hogs.
- (2) The organism is pathogenic for man.
- (3) The increasing number of cases of undulant fever points to the growing importance of this disease as a human health problem.
- (4) Complete human prophylaxis is to be achieved only by complete control of the disease in animals.
- (5) The eradication of Bang disease is perhaps the most important problem which today confronts the live stock industry and the veterinary profession.

REFERENCES

- ¹Bassett-Smith, P. W.: Jour. Royal Naval Med. Serv., xiii (1927), p. 258.
²Evans Alice C.: Jour. Inf. Dis., xxii (1918), p. 380.
³Keefer, C. S.: Bul. Johns Hopkins Hosp., xxxv (1924), p. 6.
⁴Kern, Richard A.: Amer. Jour. Med. Sci., clxxiv (1928), p. 405.
⁵Simpson, W. M.: Ann. Int. Med., iv (1930), p. 238.
⁶Cited by Simpson, W. M., ref. 5.
⁷Atwood: Cited by Blumer, George: Ann. Int. Med., iii (1929), p. 122.
⁸Hardy, A. V., Hudson M. G. and Jordan, C. F.: Jour. Inf. Dis., xlv (1929), p. 271.
⁹Carpenter, C. M., and Boak, R.: Amer. Jour. Pub. Health, xviii (1928), p. 743.
¹⁰Huddleson, I. F., and Johnson, H. W.: Jour. Amer. Med. Asso., xciv (1930), p. 1905.

PRESIDENT WIGHT: The next paper is "Blood Testing for Abortion by the Practitioner," by Drs. Walter Wisnicky and V. S. Larson, of Madison, Wisconsin. Dr. Wisnicky will present the paper. (Applause)

. . . Dr. Wisnicky read the paper. . . .

BLOOD-TESTING FOR ABORTION BY THE PRACTITIONER

By W. WISNICKY AND V. S. LARSON

Division of Live Stock Sanitation

Wisconsin Department of Agriculture and Markets

Madison, Wisconsin

A little less than three years ago organized demands for relief from the ravages of Bang's disease in cattle were made by the leaders in the dairy industry of our state. The State Department of Agriculture and Markets, in coöperation with the Wisconsin College of Agriculture, developed a state abortion control program. This program is based on all the valuable and substantial information secured from all parts of the world as a result of many years of patient research and experience in sanitary science. For the most part we have appropriated knowledge and facts developed by others. However, there is one feature in our

Bang's disease control program which has all the aspects of being original with our state. This new feature is the performance of the serologic diagnostic tests made for the disease by the veterinary practitioners approved by the State Department of Agriculture and Markets.

A skeleton view of our abortion disease problem and method of control will enable you better to understand our working methods.

Wisconsin has a population of approximately 3,000,000 cattle spread over a vast area. Approximately 15 per cent of these cattle are affected with Bang's disease as indicated by the recorded blood tests. The cattle industry keenly feels the losses from this disease and our estimate is that a loss of ten million dollars annually results from its ravages.

Chemotherapy and sure cures have failed to give the industry any relief other than pocketbook relief. Biologic agents, used against Bang's disease, in their present state are more of a liability than an asset.

The Wisconsin control program is based on the tangible and gratifying results obtained with projects based on sanitation, segregation and the blood test.

PRACTITIONERS DO THE WORK

Instead of having the actual blood-testing done by a centralized laboratory, this testing, along with other features of control, is executed by the qualified local practitioner. The local practitioner obtains the blood samples, properly identifies them, tests them, and then personally outlines the plan of procedure in each instance. The entire program is under control of the Department of Agriculture and Markets. Expert veterinary assistance is given the stock-owners and the veterinarians performing abortion control work. In initiating the work, first joint meetings of county agents, veterinarians and herd-owners are held to discuss and arrange for the beginning of the program to reach an agreement as to cost of the work, to determine places where future meetings are to be held, and any other matters of common interest. The next step is the holding of separate meetings with stock-owners and veterinarians. At the meetings held primarily for cattle-owners, not only is the disease in all its phases discussed, but the plans of sanitation and the herd-owner's obligation to the sanitary details are stressed. Veterinarians doing abortion control work in the various localities are assembled at meetings where problems relating to their duties are discussed and advice and assistance is

given where needed. By this method both the herd-owner and local veterinarian reach a common understanding in relation to the disease and to each other. Agricultural extension agents in various counties play a large part in making the necessary arrangements to secure the attendance at meetings.

Complete reports from the veterinarians doing abortion work are required to be filed promptly with the Department of Agriculture and Markets.

The rapid agglutination method makes it possible for veterinary practitioners to make the tests themselves with the same degree of efficiency as it can be made in a centralized laboratory. The rapid method of agglutination testing has the relationship to abortion control that the intradermic method of tuberculin-testing has to tuberculosis control. Both provide the opportunity to expand the work on an extensive basis at a non-prohibitive cost.

COURSES OF INSTRUCTION GIVEN

It was apparent, to begin with, that the testing could not be done in the field by veterinarians with a high degree of efficiency until a competence for the performing of that work was demonstrated. The Department of Veterinary Science at the University of Wisconsin held classes for graduate veterinarians for the purpose of instructing them in the technic of making the abortion test, the making of proper interpretations of reactions, and the applications of sanitary principles under variable conditions. Then these men were given serum samples to do practice testing and make interpretations of reactions. After they proved their competence they were recommended to be approved for abortion control work. At the present time we have about 240 veterinarians approved for giving this service to the cattle industry of the State. It was appreciated early that, with such a large number of men applying themselves to a new problem, difficulties would be encountered and that the average efficiency to begin with could not be at the highest level. We have found, though, that with the instructions received and a little experience the large majority of the veterinarians are making and interpreting the test in a very satisfactory manner.

In order to place the work on the highest plane of efficiency and accuracy we have created a disease control laboratory, the principle function of which is to do check-testing on veterinarians doing abortion control work. Every veterinarian engaged in abortion control work will be required from time to time to sub-

mit samples properly identified and with a record of his own test to the control laboratory for checking. This will enable us to seek out those not securing the proper results and afford us the opportunity to assist those who need help and remove those from the approved list who cannot learn to apply the test properly under field conditions.

Arrangements are being made also to provide closer field supervision of the approved veterinarians. A definite technic is outlined and individual supervision will be provided so as to assure us that the field practice and testing technic are performed under the best and most favorable conditions and in accordance with recommended procedure. In connection with this individual supervision given the veterinarians, the plans of sanitation applied to herds under each local veterinarian's control will be reviewed and visits are to be made to farms where assistance or verification is required.

Various arguments have been raised against the veterinarian making the test in the field, the chief of which has been that the practitioner is not capable of properly performing and interpreting the test. With our method of instructing and supervising the work we find that practitioners are quite competent in both making and interpreting the test as well as directing the sanitary procedure on the farm. Our experience has been that the cattleowner prefers to employ the local veterinarian whom in most instances he knows both professionally and socially and in whom he has implicit confidence. The veterinarian, likewise, senses the full measure of his responsibility and consequently performs the work with exacting care and accuracy, not only because he aims to render efficient service to his friend and client, but also because the future will reveal in no uncertain way whether such service was intelligently and accurately rendered.

ADDITIONAL ADVANTAGES

Practitioner testing offers additional advantages to the program. Perhaps the greatest of these is an economic one. To render this service efficiently on a state-wide basis requires that the obtaining of proper blood specimens with accurate identification must be performed by disinterested and competent persons. The veterinary profession is the logical group to perform this duty in view of the fact that its members can be held answerable for both the accuracy and integrity of the service. If the veterinarians assume the responsibility for the securing of blood

samples, their proper handling and identification, they can perform the additional service of testing with only a slight increase in cost. The actual testing of the samples can be performed in some instances with no greater effort than that required to pack the samples properly and then mail them to the laboratory. When the functions of obtaining the samples, performing the tests and the outlining of the sanitary management of the herd are undertaken by one person, it is apparent that the work can be handled with more economy than if the work is split up between more than one party, involving additional laboratory fees and charges for packing and mailing.

Another thought on this point is that under our conditions the distance of three hundred and more miles from certain parts of the State makes it a long way to send samples to a central laboratory. Blood samples sent long distances, and sometimes even when mailed a short way, are exposed to the hazards of heat or freezing weather, delay and breakage. When the testing is performed at home these risks are avoided and the test always can be applied on samples in good condition.

Practitioner testing is admirably adapted in testing for interstate shipment. It obviates the delay of waiting for the returns from the laboratory, which in most instances requires several days.

SKILL AND JUDGMENT REQUIRED

The task of performing and interpreting the abortion test requires no greater skill than that required in applying and interpreting a tuberculin test. Both require a high degree of skill and judgment. If the qualified veterinarian is capable of tuberculin-testing cattle, he is equally capable of doing the testing for abortion. From our own observation of the testing done in our state so far, we feel that the practitioner adapts himself more quickly and more readily to the performance of the abortion test efficiently than he did to the making of the tuberculin test.

From such work as has been performed in Wisconsin, field testing has proved to be well adapted to our circumstances. Sufficient results have been obtained to give us the necessary encouragement for the development and perfection of our present plan.

A little less than a year and a half ago, the first certificate was awarded for an abortion-negative herd. Now there are in Wisconsin twenty-seven herds certified as abortion-negative.

There are two other problems in connection with the abortion control work of which we wish to make brief mention. They are the indemnity and the antigen problems.

THE QUESTION OF INDEMNITY

We are frequently confronted with the question—Why do not the state and federal governments pay indemnity on abortion-positive cattle on a basis similar to that paid for cattle reacting to the tuberculin test? In answer to this question we begin with pointing out that in the light of our present knowledge the menace to public health as a result of Bang's disease is practically negligible. This disease has such remote relationship to public health that legislation would not be justified on a public health premise. The disease chiefly presents an economic problem affecting directly one industry, namely, the cattle industry. To secure legislation favoring the economic uplift of one class would not be looked upon favorably by citizens engaged in other industries.

In further explaining the indemnity query we call attention to the fact that in handling the Wisconsin tuberculosis problem we originally had only 2.8 per cent of cattle reacting to the tuberculin test and that dealing with such small average infection more than two million dollars were expended annually in certain years by the state and federal governments in the payment of indemnity and operation costs. With abortion disease the infection is considerably higher. About fifteen per cent of the cattle in the State may disclose infection. If a commensurate indemnity were provided for reactors to the abortion test, the State's share of an appropriation for this work would not be in terms of one million dollars; it would be in terms in excess of ten million dollars annually. This amount is so stupendous that the idea is immediately dispelled from the minds of those entertaining hopes for indemnity. Cattle, especially those carrying desirable blood lines, may harbor the disease and still be of great economic value when segregated from animals free from the disease. This condition would militate against the prompt disposal of reacting animals by slaughter.

Another condition to be considered in relation to indemnity, when contagious abortion is concerned, is that an agglutination reaction may be produced at will by the injection of the germs or their products. This condition did not obtain in tuberculin-testing. Tuberculosis germs were not as available as the germs of abortion disease and their products. In view of this situation,

abortion disease does not lend itself as readily to indemnity as tuberculosis infection.

ANTIGENS PRESENT A PROBLEM

The final point we wish to touch on is concerning antigens or test fluid used in performing the abortion test. At present we sanction commercial preparations which may be used by approved veterinarians for the performance of official work. On the whole, the commercial preparations are not entirely satisfactory. There is a lack of uniformity between the products of the different firms. Sometimes there is a lack of essential uniformity between different quantities produced by the same concern. There is ample proof that an abortion antigen of a highly satisfactory type and standard can be prepared for widespread field use. Antigens varying in character and agglutinability create a situation which cannot long endure. Commercial organizations producing antigens for making abortion tests must either agree among themselves or be directed by some federal agency regarding uniformity of production practices. Antigens made by different firms, in order to possess essentially similar characteristics and a practically uniform agglutination ability, must be made from polyvalent strains of organisms having in the aggregate similar agglutinating ability and produced according to a mutual technic.

In closing we wish to indicate that the present knowledge on abortion disease, in our opinion, can and is being used to great economic advantage in ridding herds of Bang's disease. The entire problem of abortion control is comparatively new to us, but with the advancement of this work we are adding the knowledge supplied by research and gained by practical experience. Every one will agree that a simpler and more efficient method than the one now used for handling this disease would be welcome. But we do not have that desired method at present. It may be just around the corner or it may be more than a century away. In the meantime, instead of remaining static, we are attacking this disease problem with the blood test and that old stand-by known as "sanitary practice."

PRESIDENT WIGHT: The next paper is "Agglutination Tests of Live Stock Associated with Cases of Undulant Fever," by Drs. Charles Murray and S. H. McNutt, Department of Veterinary Investigation, Iowa State College, Ames, Iowa. Dr. Murray will read the paper. (Applause)

Dr. Murray read the paper.

THE RESULT OF AGGLUTINATION TESTS OF BLOOD FROM ANIMALS ON FARMS WHERE CASES OF UNDULANT FEVER OCCUR

By CHAS. MURRAY, S. H. McNUTT and PAUL PURWIN

*Department of Veterinary Investigation, Iowa State College
Ames, Iowa*

In coöperation with the Iowa Department of Agriculture, the Iowa State Health Department and the United States Public Health Service, the Department of Veterinary Investigation, Iowa State College, during the past three years, has applied the agglutination test for Bang's disease to a large series of blood samples of cattle and swine, mostly cows and sows, from herds on farms where cases of undulant fever have occurred. This work has been carried on in an effort to determine whether the infection in undulant fever cases had its origin in live stock. Our greater interest was in the *Brucella* infection in live stock, particularly in its relation to undulant fever. The Public Health Service workers were naturally most interested in the infection in the human but were likewise concerned about the relationship of the human cases to the infection in live stock. At the outset our opinions were somewhat at variance, the representatives of the Public Health Service feeling that the dairy cow, through infective milk, was largely responsible for the cases of undulant fever occurring in Iowa. We, on the other hand, were doubtful of this and felt that the case against the dairy cow was not well established. As time has passed and the number of tests has increased, we have both altered our original opinions somewhat and at present are doubtless in quite close agreement.

In order to arrive at some estimate of the incidence of Bang's disease in the State, for comparison with the infection on farms where cases of undulant fever were involved, we have tested a large number of blood samples from hogs and cattle that, as far as known, were unconnected with cases of undulant fever. It was impossible to bleed individual herds on private farms for this work, so arrangements were made with a nearby packing-plant* permitting us to secure samples from their killing-floor. This establishment handles mostly animals that come from Iowa farms and those from which blood samples were obtained were

*We acknowledge with thanks the kind coöperation of Superintendent Barrett, of the Iowa Packing Company, Des Moines, and Dr. C. W. Deming, Inspector-in-Charge, B. A. I., in securing the blood samples used in this study.

abortion disease does not lend itself as readily to indemnity as tuberculosis infection.

ANTIGENS PRESENT A PROBLEM

The final point we wish to touch on is concerning antigens or test fluid used in performing the abortion test. At present we sanction commercial preparations which may be used by approved veterinarians for the performance of official work. On the whole, the commercial preparations are not entirely satisfactory. There is a lack of uniformity between the products of the different firms. Sometimes there is a lack of essential uniformity between different quantities produced by the same concern. There is ample proof that an abortion antigen of a highly satisfactory type and standard can be prepared for widespread field use. Antigens varying in character and agglutinability create a situation which cannot long endure. Commercial organizations producing antigens for making abortion tests must either agree among themselves or be directed by some federal agency regarding uniformity of production practices. Antigens made by different firms, in order to possess essentially similar characteristics and a practically uniform agglutination ability, must be made from polyvalent strains of organisms having in the aggregate similar agglutinating ability and produced according to a mutual technic.

In closing we wish to indicate that the present knowledge on abortion disease, in our opinion, can and is being used to great economic advantage in ridding herds of Bang's disease. The entire problem of abortion control is comparatively new to us, but with the advancement of this work we are adding the knowledge supplied by research and gained by practical experience. Every one will agree that a simpler and more efficient method than the one now used for handling this disease would be welcome. But we do not have that desired method at present. It may be just around the corner or it may be more than a century away. In the meantime, instead of remaining static, we are attacking this disease problem with the blood test and that old stand-by known as "sanitary practice."

PRESIDENT WIGHT: The next paper is "Agglutination Tests of Live Stock Associated with Cases of Undulant Fever," by Drs. Charles Murray and S. H. McNutt, Department of Veterinary Investigation, Iowa State College, Ames, Iowa. Dr. Murray will read the paper. (Applause)

Dr. Murray read the paper.

THE RESULT OF AGGLUTINATION TESTS OF BLOOD FROM ANIMALS ON FARMS WHERE CASES OF UNDULANT FEVER OCCUR

By CHAS. MURRAY, S. H. McNUTT and PAUL PURWIN

*Department of Veterinary Investigation, Iowa State College
Ames, Iowa*

In coöperation with the Iowa Department of Agriculture, the Iowa State Health Department and the United States Public Health Service, the Department of Veterinary Investigation, Iowa State College, during the past three years, has applied the agglutination test for Bang's disease to a large series of blood samples of cattle and swine, mostly cows and sows, from herds on farms where cases of undulant fever have occurred. This work has been carried on in an effort to determine whether the infection in undulant fever cases had its origin in live stock. Our greater interest was in the *Brucella* infection in live stock, particularly in its relation to undulant fever. The Public Health Service workers were naturally most interested in the infection in the human but were likewise concerned about the relationship of the human cases to the infection in live stock. At the outset our opinions were somewhat at variance, the representatives of the Public Health Service feeling that the dairy cow, through infective milk, was largely responsible for the cases of undulant fever occurring in Iowa. We, on the other hand, were doubtful of this and felt that the case against the dairy cow was not well established. As time has passed and the number of tests has increased, we have both altered our original opinions somewhat and at present are doubtless in quite close agreement.

In order to arrive at some estimate of the incidence of Bang's disease in the State, for comparison with the infection on farms where cases of undulant fever were involved, we have tested a large number of blood samples from hogs and cattle that, as far as known, were unconnected with cases of undulant fever. It was impossible to bleed individual herds on private farms for this work, so arrangements were made with a nearby packing-plant* permitting us to secure samples from their killing-floor. This establishment handles mostly animals that come from Iowa farms and those from which blood samples were obtained were

*We acknowledge with thanks the kind coöperation of Superintendent Barrett, of the Iowa Packing Company, Des Moines, and Dr. C. W. Deming, Inspector-in-Charge, B. A. I., in securing the blood samples used in this study.

from Iowa, as far as known, and doubtless fairly representative of the State. Most of the cows tested were sent to slaughter because they were tuberculous; a few because they were non-productive and all were from Iowa. There was nothing to indicate that any of the animals, either cattle or hogs, had been sold because of Bang's disease infection. It is estimated that the cows came from about 50 different farms and that the sows represented about 35 farms. The results of tests made on samples from the packing-house, assumed to represent the average of Bang's disease infection in Iowa, are compiled in table I.

TABLE I—Average of brucella infection in Iowa cattle and hogs

CLASS OF ANIMAL	TESTED	REACTED		NEGATIVE
		NUMBER	%	
Cows	155	29	18.7	126
Heifers	205	5	2.5	200
Steers	175	4	2.2	171
Veal calves	75	3	4.0	72
Sows	188	8	4.2	180
Gilts	490	14	2.8	476
Barrows	548	10	1.8	538
Stags	52	2	4.0	50

The percentage of reactors in beef and dairy cattle was the same.

The results of tests of animals from farms where undulant fever cases occurred are compiled in table II.

TABLE II—Results of tests on farms where undulant fever existed

	NUMBER	%
Herds where both cattle and hogs were tested	62	
Herds where both cattle and hogs reacted	15	24.2
Herds where both cattle and hogs were non-reactors	18	29.0
Herds with reacting cattle and non-reacting hogs	16	25.8
Herds with non-reacting cattle and reacting hogs	13	21.0
Total number of cattle herds tested	115	
Herds where cattle only were tested	53	
Herds where cattle only were tested—no reactors	18	34.0
Cattle herds reacting	66	57.4
Cattle herds not reacting	49	42.6
Total number of cows tested	1096	
Individual cows reacting	222	20.3
Individual cows not reacting	874	79.7
Total number of hog herds tested	64	
Hog herds reacting	28	43.7
Hog herds not reacting	36	56.2
Total number of sows tested	560	
Individual sows reacting	132	23.5
Individual sows not reacting	428	76.4

On 53 of the farms cattle only were tested, while on 2 farms hogs only, and on 62 farms both cattle and hogs.

On 29 per cent of the farms there were no reactors in either cattle or hogs, showing that human infection in these cases did not originate from live stock on these farms. Of the 53 farms where cattle only were tested, there were 18 herds (34 per cent) with no reactors, showing that in these cases cattle on the farms were not responsible for the human infection. We have no recorded data from these farms, however, to show that there may not have been reacting hogs as the source of infection. If, then, it is impossible to incriminate live stock in 29 per cent of the cases, the question arises as to how many of the reacting herds are responsible for the human infection. The occurrence of infected live stock associated with cases of undulant fever is presumptive but not conclusive evidence that infection was contracted from such stock. Since more human cases were associated with infected live stock than were not, it seems reasonable to conclude that some cases may have had their origin in infected cattle or hogs, but it is difficult to account for the source of infection on the 29 per cent of farms where no reacting live stock was found. When these results are viewed as a whole, they are suggestive, but considered in individual cases, their significance is questionable.

In so far as possible, the extent of *Brucella* infection on farms where cases of undulant fever existed is compared with that on the average farm where none such had occurred.

TABLE III—*The amount of brucellosis in live stock on farms where undulant fever existed compared with the amount of infection on the average farm*

	FARMS WHERE UNDULANT FEVER EXISTED		FARMS WHERE UNDULANT FEVER WAS NOT KNOWN TO EXIST	
	NUMBER	%	NUMBER	%
Total number of cows tested	1096		155	
Individual cows reacting	222	20.3	29	18.7
Individual cows not reacting	874	79.7	126	81.3
Total number of sows tested	560		188	
Individual sows reacting	132	23.5	8	4.5
Individual sows not reacting	428	76.4	180	95.7

The figures in table III show that the extent of infection in both classes of animals on undulant-fever farms was greater than on the average Iowa farm. In sows on undulant-fever farms it was 23.5 per cent, as against 4.2 per cent on the average farm. In cows the difference was not so great, being 20.3 per cent, as against 18.7 per cent or 1.6 per cent, which does not appear to

be of great significance. If cattle which have been considered such a potential source of infection are truly so, it would seem the difference should be greater. In sows the difference is marked, being 19.2 per cent, over five times as great on undulant-fever farms as on the average farm and twelve times greater than in cows. Since the incidence of *Brucella* infection in hogs on the average Iowa farm was small, the chance of exposure of humans was small and since the amount of infection on undulant-fever farms was great, the chance of exposure was correspondingly great. On the other hand the incidence of Bang's disease in cows on the average farm was high in comparison with that on undulant-fever farms, so that exposure of humans often occurred. In spite of this greater exposure the chance of contracting the disease was not so great. From this it would appear logical to conclude that *Brucella* infection in swine is much more dangerous to man than the same infection in cattle. Tests of a greater number of animals may show more nearly the significance of these figures. Reliable herd histories obtained for 16 reacting herds on farms where cases of undulant fever were involved showed that abortions had occurred upon only 8, indicating that the act of abortion in itself was not of epidemiological significance nor would the name "infectious abortion" have had meaning in such herds. Further, two of the non-reacting herds had had abortions not due to *Brucella* infection. Of 21 reacting herds of sows, 13 had had no abortions and one non-reacting herd had had abortions not due to *Brucella* infection. (See table IV.)

TABLE IV—*Abortions in reacting and non-reacting herds*

	HERDS POSITIVE ABORTIONS PRESENT	HERDS POSITIVE ABORTIONS ABSENT	HERDS NEGATIVE ABORTIONS PRESENT
Cattle	8	8	2
Hogs	8	13	1

SUMMARY

The average amount of *Brucella* infection in cattle and hogs throughout the state of Iowa is estimated by tests of animals from the killing-floors of a large packing-plant. The extent of infection in live stock on farms where cases of undulant fever were involved compared with the above shows a higher percentage. A large percentage of undulant-fever farms (29 per cent) shows no reactors in either cattle or hogs, suggesting the possibility of some other source of infection. Data presented indicate that

Brucella infection in swine is more dangerous to man than infection in cattle.

PRESIDENT WIGHT: One of the very important features of this meeting, of course, is the report of the Committee on Abortion. We will next have the report presented by Dr. F. B. Hadley, Chairman, Madison, Wisconsin. (Applause)

Dr. Hadley read the report.

REPORT OF COMMITTEE ON ABORTION

DR. F. B. HADLEY, *Chairman*, Madison, Wis.

Dr. M. F. Barnes, Harrisburg, Pa. Dr. C. P. Fitch, Saint Paul, Minn.
Dr. J. M. Buck, Bethesda, Md. Dr. Ward Giltner, East Lansing, Mich.
Dr. Harry W. Caldwell, Wheaton, Ill. Dr. E. M. Pickens, College Park, Md.
Dr. W. H. Welch, Springfield, Ill.

The information about Bang disease at present available represents the results of investigations that have been conducted for more than a quarter of a century. During this period, as would be expected, various ideas relative to methods of control and eradication have been advanced. Naturally these have been reflected in reports of former committees of this Association.

Your Committee is led to believe that at no time in the history of Bang disease has the feeling been so general as at the present time that successful use may be made of the agglutination test, both in preventing the introduction of the disease into herds that are Bang disease-free and in eradicating it from those in which it is known to exist.

Experience has taught that a blood-testing program can be employed to advantage in both the single- and the multiple-unit herd. The effectiveness of such a program, however, hinges somewhat on facilities for keeping the reactors separated from the non-reactors and upon adhering strictly to the details of the control measures that have been shown to be reliable. If these are followed, the disease can be brought under control and young stock for replacement purposes can be raised from either unit.

While it may become possible to treat successfully the individual case of infectious abortion with some as yet undiscovered therapeutic agent, the final solution of the problem, as in all other diseases caused by an infecting micro-organism, can be accomplished, only by abolition of the causative germ itself, thus preventing the possibility of animals coming in contact with it. Upon this basis have been erected the effective measures for control now in vogue.

The development of the rapid agglutination test for the detection of Bang disease and its increasing use as a diagnostic measure is recognized by your Committee as a valuable adjunct in the control of the disease.

Artificial immunization, as a means of combating Bang disease, in its present stage of development, is recognized by your Committee as being far from successful as a practical means of dealing with this disease. Despite its limitations and objectionable features, preventive vaccination furnishes a field for further investigation that has not been entirely or sufficiently explored.

The action taken by numerous states during the last year with reference to the exclusion of Bang-diseased cattle intended for breeding or dairy purposes reflects growing interest in and alertness to the fact that its menacing nature cannot economically be ignored. At present eighteen states and the Territory of Hawaii require that dairy or breeding cattle offered for entry into their confines shall have successfully passed a blood test or shall have come from Bang disease-free, accredited herds. In addition to those there are eleven other states which prohibit the entry of infected animals, except under special permit. When properly enforced, it is reasonable to assume that these regulations have had the effect of retarding the dissemination of the disease to a considerable extent. At any rate, they have emphasized its importance and been the means of prompting efforts on the part of many stock-owners to grapple with the problem more vigorously.

be of great significance. If cattle which have been considered such a potential source of infection are truly so, it would seem the difference should be greater. In sows the difference is marked, being 19.2 per cent, over five times as great on undulant-fever farms as on the average farm and twelve times greater than in cows. Since the incidence of *Brucella* infection in hogs on the average Iowa farm was small, the chance of exposure of humans was small and since the amount of infection on undulant-fever farms was great, the chance of exposure was correspondingly great. On the other hand the incidence of Bang's disease in cows on the average farm was high in comparison with that on undulant-fever farms, so that exposure of humans often occurred. In spite of this greater exposure the chance of contracting the disease was not so great. From this it would appear logical to conclude that *Brucella* infection in swine is much more dangerous to man than the same infection in cattle. Tests of a greater number of animals may show more nearly the significance of these figures. Reliable herd histories obtained for 16 reacting herds on farms where cases of undulant fever were involved showed that abortions had occurred upon only 8, indicating that the act of abortion in itself was not of epidemiological significance nor would the name "infectious abortion" have had meaning in such herds. Further, two of the non-reacting herds had had abortions not due to *Brucella* infection. Of 21 reacting herds of sows, 13 had had no abortions and one non-reacting herd had had abortions not due to *Brucella* infection. (See table IV.)

TABLE IV—*Abortions in reacting and non-reacting herds*

	HERDS POSITIVE ABORTIONS PRESENT	HERDS POSITIVE ABORTIONS ABSENT	HERDS NEGATIVE ABORTIONS PRESENT
Cattle	8	8	2
Hogs	8	13	1

SUMMARY

The average amount of *Brucella* infection in cattle and hogs throughout the state of Iowa is estimated by tests of animals from the killing-floors of a large packing-plant. The extent of infection in live stock on farms where cases of undulant fever were involved compared with the above shows a higher percentage. A large percentage of undulant-fever farms (29 per cent) shows no reactors in either cattle or hogs, suggesting the possibility of some other source of infection. Data presented indicate that

Brucella infection in swine is more dangerous to man than infection in cattle.

PRESIDENT WIGHT: One of the very important features of this meeting, of course, is the report of the Committee on Abortion. We will next have the report presented by Dr. F. B. Hadley, Chairman, Madison, Wisconsin. (Applause)

Dr. Hadley read the report.

REPORT OF COMMITTEE ON ABORTION

DR. F. B. HADLEY, *Chairman*, Madison, Wis.

Dr. M. F. Barnes, Harrisburg, Pa. Dr. C. P. Fitch, Saint Paul, Minn.
Dr. J. M. Buck, Bethesda, Md. Dr. Ward Giltner, East Lansing, Mich.
Dr. Harry W. Caldwell, Wheaton, Ill. Dr. E. M. Pickens, College Park, Md.
Dr. W. H. Welch, Springfield, Ill.

The information about Bang disease at present available represents the results of investigations that have been conducted for more than a quarter of a century. During this period, as would be expected, various ideas relative to methods of control and eradication have been advanced. Naturally these have been reflected in reports of former committees of this Association.

Your Committee is led to believe that at no time in the history of Bang disease has the feeling been so general as at the present time that successful use may be made of the agglutination test, both in preventing the introduction of the disease into herds that are Bang disease-free and in eradicating it from those in which it is known to exist.

Experience has taught that a blood-testing program can be employed to advantage in both the single- and the multiple-unit herd. The effectiveness of such a program, however, hinges somewhat on facilities for keeping the reactors separated from the non-reactors and upon adhering strictly to the details of the control measures that have been shown to be reliable. If these are followed, the disease can be brought under control and young stock for replacement purposes can be raised from either unit.

While it may become possible to treat successfully the individual case of infectious abortion with some as yet undiscovered therapeutic agent, the final solution of the problem, as in all other diseases caused by an infecting micro-organism, can be accomplished, only by abolition of the causative germ itself, thus preventing the possibility of animals coming in contact with it. Upon this basis have been erected the effective measures for control now in vogue.

The development of the rapid agglutination test for the detection of Bang disease and its increasing use as a diagnostic measure is recognized by your Committee as a valuable adjunct in the control of the disease.

Artificial immunization, as a means of combating Bang disease, in its present stage of development, is recognized by your Committee as being far from successful as a practical means of dealing with this disease. Despite its limitations and objectionable features, preventive vaccination furnishes a field for further investigation that has not been entirely or sufficiently explored.

The action taken by numerous states during the last year with reference to the exclusion of Bang-diseased cattle intended for breeding or dairy purposes reflects growing interest in and alertness to the fact that its menacing nature cannot economically be ignored. At present eighteen states and the Territory of Hawaii require that dairy or breeding cattle offered for entry into their confines shall have successfully passed a blood test or shall have come from Bang disease-free, accredited herds. In addition to those there are eleven other states which prohibit the entry of infected animals, except under special permit. When properly enforced, it is reasonable to assume that these regulations have had the effect of retarding the dissemination of the disease to a considerable extent. At any rate, they have emphasized its importance and been the means of prompting efforts on the part of many stock-owners to grapple with the problem more vigorously.

Your Committee also urges all veterinarians who are advising breeders about the management of their herds to inform themselves relative to (1) the significance of reactions in the different dilutions; (2) the significance of different degrees of the reaction; (3) the sanitary measures to be used in controlling the infection; (4) the proper time to make and the necessity of making retests; (5) the different plans of herd management available; (6) the details of the plan finally selected as being best suited for a given herd.

Knowledge as to how great a menace Bang disease of cattle and *Brucella* infection of swine may be for human beings is believed by your Committee to be somewhat vague at present. Nor is this knowledge likely to be revealed definitely in the immediate future. However, evidence now available is regarded as sufficient to warrant accepting the following facts: (1) That *Brucella abortus*, of both the bovine and the swine varieties, is pathogenic for human beings; (2) that any one of these varieties of microorganisms may be encountered in cases of undulant fever; (3) that while some doubt still exists in the minds of certain investigators as to the sources of human infection where the bovine and swine varieties are involved, evidence points strongly to contact with infected cattle or swine or their carcasses, and to a lesser degree to infection from raw dairy products. Unquestionably this subject needs further diligent study by properly qualified research workers.

As yet it is not perfectly clear what advice should be given veterinarians, stockmen, butchers and meat inspectors with respect to suitable measures for self-protection against brucellosis. Consequently, it behooves us to study swine and cattle infection from the standpoint of meat inspection. The lesions in both of these species are frequently, if not usually, microscopic and thus escape the vigilance of the meat inspector.

The increased activities which numerous states have taken during the last year in dealing with their Bang disease problems, and the growing interest in the control and eradication of the disease which has been manifested by stock-owners in general are encouraging. These facts warrant your Committee in making the following recommendations: (1) That this Association congratulate the live stock sanitary authorities and the live stock interests of the United States on the work already accomplished, and assure them both of our aid in every way possible. (2) That the present research program be enlarged by the appropriation of funds by the different states and by the federal government. (3) That other work be continued.

In conclusion, it is recommended that the Association change the name of the Committee on Abortion to the "Committee on Bang Disease" to harmonize with the terminology adopted by the American Veterinary Medical Association at its 1929 meeting.

DR. HADLEY: I would like to offer that last recommendation as a resolution, to be considered by the Resolutions Committee. (Applause)

Dr. Hadley moved that the report be adopted by the Association. The motion was regularly seconded.

PRESIDENT WIGHT: It has been moved and seconded that the report be adopted. Is there any discussion?

DR. N. S. MAYO: Do I understand that the question of changing the name of the Committee is to be referred to the Resolutions Committee or does the adoption of this report carry with it the change of name?

PRESIDENT WIGHT: I would rule that the adoption of this report would carry with it the change of name. That is only in keeping with what has taken place in other organizations.

The motion to adopt the report was carried.

PRESIDENT WIGHT: The program provides for the discussion to be opened by Dr. R. R. Birch, of the New York State Veterinary College, Ithaca. Dr. Birch.

DR. R. R. BIRCH: Mr. President and Gentlemen: One of the things which has impressed me as I have listened to the program this afternoon has been the progress which has been made during the last eight or ten years. I can imagine the reception some of these papers would have received as short a time as five years ago and I can imagine the reception which the report of

our Committee would have received five years ago. Certainly this is one of the times when we should look at the doughnut instead of at the hole.

The program has been exceedingly well balanced. It has presented the various phases of the subject and it has shown clearly the direction Bang abortion disease control work is certain to follow in the future.

We have the disease very well charted. And I want to say that it is through close investigations, such as Doctor Cotton reported in the first paper, that this has been possible. There is an accurate test for the disease. That statement would have been challenged eight or ten years ago. In all important dairy states there are herds which have been freed of the disease and the owners know the difference between these clean herds and those which are infected. This is all a record of progress.

Then we have the question as to the importance of human infection. We have heard it both minimized and exaggerated this afternoon. I don't quite agree with either point of view. That is, I don't think it is the most important public health problem we have, neither do I regard it as negligible. It is merely one of many important public health problems that merit further study.

The question before the house, as I see it, is just how we are going to use to the best advantage, the knowledge which already has been developed. We had a very good paper this afternoon dealing with that particular phase of the problem. We will not learn to swim until we plunge in. The gentlemen from Wisconsin described one method of plunging in. This extensive use of the rapid method of conducting the agglutination test will invite many errors but at least we shall know the difficulties of such a program after it has had a fair trial.

Every important dairy state must develop a program for the control of Bang abortion disease. These programs will differ but all will involve just two or three essentials. One is an accurate test interpreted by those who really understand. Another is specific, close-range advice to the owner of the cattle after the test is made. A third prerequisite for the most efficient state program will consist of official recognition to the men who have cleaned up their herds. Personally, I should like to see it go a little further than that. I should like to see official recognition for the men who are doing periodical testing, so that the tests can be made a matter of public record, and the men encouraged and stimulated to travel just a little faster in the direction of clean herds.

It is in supplying the specific advice which must follow every test that the practicing veterinarian will find a great field. There are not sufficient men to handle this problem without him for he is the only one who can advise to the best advantage with respect to the handling of each individual herd. Each herd presents its own peculiar problem and no standardized procedure can be made effective as long as we keep our reacting cattle. I do not care to express an opinion regarding the use of the rapid test by the practicing veterinarian. If it proves to be an accurate test, if it is well interpreted in the field, and if the service goes with it which should go with any well interpreted test, it will be a fine thing. If those things fail we must fall back on the laboratories. I am very sure that some practicing veterinarians do not want to be bothered with the test, for it does not always dovetail well with busy practice. Also there are those practitioners who do not care to accept the responsibility of testing their client's cattle for interstate shipment. Future experience must determine just what plan is best. I suggest, though, that practicing veterinarians, during the first year or two, be very careful to check up with some laboratory which has been in operation for some time and in which much routine testing is being done.

I feel sure that in our sanitary codes we have been a trifle hasty in trying to lay the pattern of infectious abortion over that of tuberculosis. There are two particulars in which the diseases are almost precisely alike. There is an accurate test for each and there is only one known successful way to handle either, which is to test it out of a herd and keep it out.

But, there are certain points in which there are very great and fundamental differences. One of these is that we have agreed, and have good reasons for agreeing, that we are going to keep a great many of our reactors to the agglutination test. They cannot all be killed for there are too many of them and they

are worth too much money. They can be made to maintain blood lines which never should be lost and they can serve as temporary fill-ins, so to speak, until clean herds can be developed to replace them. I don't believe there is any disagreement with respect to these things.

A second point of difference is found in the fact that there are recoveries from infectious abortion. Not so many as some believe, but enough so that recoveries enter into the problem.

A third point of difference appears in the fact that Bang abortion disease, which we think of too often as a chronic malady, sometimes develops all the characteristics of an acute infectious disease. We can't handle it exactly as we handle tuberculosis. Even with the latter disease we get into trouble enough in individual testing which ignores the herd status and our troubles will be multiplied if we rely on individual testing with Bang abortion disease.

A fourth difference lies in the fact that young stock are not highly susceptible to Bang abortion disease, whereas the opposite is true regarding tuberculosis.

The fifth fundamental difference, and I think the most important as far as our sanitary code is concerned, is the fact that we have what we might term clinically immune animals which are really carriers and spreaders of the disease. There are certain herds in which this immunity to Bang abortion disease can be used to great advantage. The selected chronic reactor to the agglutination test is worth more in reacting herds than is the clean animal. The big problem before us is how to make the most use of our animals which react to the agglutination test; how to put them where they will do the most good and the least harm.

We are accustomed in this country to dealing with tuberculosis where we kill the reactor, with foot-and-mouth disease where we kill the infected animal, and I think I might add hog cholera where we do nothing except vaccinate. But the thing which is fundamental to remember is that Bang abortion disease presents its own particular problems and we must build our regulations carefully on the peculiarities of the disease with which we are dealing.

There is a certain type of law which is in vogue at the present time. I don't know whether the good points in it outweigh the harm associated with it but I do know that it is not a rose without a thorn. The law which prevents transportation of reactors to the agglutination test from one state to another certainly is building up a false sense of security among those who purchase clean cattle. I am speaking of the individual test, which ignores the status of the herd from which the animals are purchased. If anyone thinks he can go into some distant state and buy mature animals on individual test and keep them testing clean, he will change his mind after he tries it a few times. It just can't be done as a routine practice. Does such a law do any good? That is a question which I don't want to answer but I do want to point out a very serious and fundamental defect in it.

The more important problem concerns the distribution of clean-testing cattle after they reach the state into which they are imported. This is a thing which we don't hear discussed very much. We really must know three things if we are going to use the agglutination test successfully in the purchase of cattle. We must know the status of the contact animals in the herd from which the animals came. We must know of course how the transferred cow herself tests and then we must know the status of the herd into which she is introduced. This law puts all the emphasis on the animal which is shipped. I believe that as time goes on this defect will be recognized and corrected.

Another word with respect to the regulations and I am through. Those which are put in force should be very carefully considered. They should be considered in consultation with all who are involved, including breeders, sanitary officials and practicing veterinarians. Breeders pretty generally have dropped out of this Association and I regard it as a very great loss. If more of them were here, some of the errors which we have made would have been avoided, and I am sure more careful consideration would have been given to some of the details. I suggest as a partial program for next year's Committee on Bang Abortion Disease a very close inquiry into sanitary regulations with a comprehensive report to this Association.

There is every evidence that very great progress is being made. There is great encouragement in the papers presented here and in the attitude which is

being shown toward the control of this disease, but it will require sustained effort and careful work if an effective plan is to be developed. I am confident that such a plan is in the making, for the many herds which now are clean constitute an object lesson which our breeders will not long ignore.

DR. N. S. MAYO: There is one point that was brought out in Dr. Wisnicky's paper this afternoon that I think is frequently overlooked, and that is the question of the antigen that is used in making the abortion test. Unfortunately, we do not have any official standard. I think it is unnecessary for me to state that the antigens supplied often vary considerably.

Only last week, in talking with a practitioner who is going a lot of this work I asked him regarding the antigens used and he told me, but he said, "If I were selling cattle I would use so-and-so's antigen, but if I were buying I would use somebody's else." It seems to me there is just as great need of having a standard antigen as there is for having a standard tuberculin. I believe that that is very important.

Another thing that the papers and discussions today indicate, in connection with undulant fever of man, is that we may have, if I may use such an expression, a human species that hasn't been isolated yet. (Applause)

DR. A. T. KINSLEY: This discussion has certainly been very interesting. I want to coincide with Dr. Birch and Dr. Mayo relative to the standard of antigen used. I do not believe that abortion disease can be controlled by the herd-division process without a standardized antigen.

Another question that I want to ask is relative to the economic side of controlling abortion disease by the dual-herd system. According to Dr. Murray, in Iowa, probably twenty per cent of the herds are affected, meaning that on twenty per cent of the farms in Iowa there would be two separate herds of cattle. What about the economic side of carrying that out?

In relation to public health, with the evidence before us, it must be admitted that at least there is strong circumstantial evidence that the disease can or possibly may be transmitted through the agency of milk or otherwise to the human. However, at the present time, as I understand, there are records of some 2,500 or 3,000 cases reported annually. Suppose we double that number to 5,000 cases in the United States, which would make one to 25,000 humans that become involved with Malta fever or with undulant fever, or whatever you wish to designate it—one to 25,000.

Public health officials concern themselves primarily with infective diseases, which is right and correct, but, gentlemen, did you ever stop to think that in the United States about one in 25,000 or less is killed annually by automobiles? Should we prohibit automobiles on the highways, or should those people who accidentally kill somebody with their automobiles be jailed? I am speaking from the standpoint of human health. In our little city there is one in each 5,000 killed annually by automobiles, yet our public health officials don't seem to take over that angle. I say the loss is much larger, the expense to human life is much greater from automobile death than from undulant fever. That does not deter us from controlling or preventing the dissemination of undulant fever to man, understand that. But I say there are other problems that are fully as large and of more significance as far as human health is concerned.

Relative to the regulation that Dr. Birch touched on and gave a very splendid discussion thereof, it appeals to me. Eighteen states now have regulations requiring the testing of all breeding and dairy animals. Some few states, I do not know how many, designate that all females going into these states shall be abortion-tested and show freedom from the infection according to that test before they can be shipped. Some of the states do not designate any age. Perhaps I am ignorant on this subject, but as I understand it, within a short time after the calf is taken from a positive reacting cow, that calf will not give a positive reaction, it is not infected until it becomes sexually mature or actually pregnant. Then why require an abortion test on that particular class of animal? Why charge the live stock industry with an unnecessary expense? Why not make the regulation to cover the facts as they have been demonstrated relative to this disease, without that added expense? Dr. Birch brought out the question very nicely.

Within the last year I had information come from two states in which this regulation is in force, that in cattle shipped as negative animals there was a

high percentage of abortions. On further inquiry it was found that in those instances, those cattle went onto premises and mingled with cattle that were aborters. Why do our state regulatory officials have such regulations without notifying those men that have cattle shipped in that they should be kept isolated from their aborting herds? Are our regulatory officials doing their duty? In other words, are we protecting the live stock industry? Is it our purpose to install and inaugurate a lot of these regulations that are relatively expensive for the cattle industry and yet produce little results to the cattle industry?

I just leave those questions for you. (Applause)

DR. J. W. CONNAWAY: Mr. Chairman, I would dislike very much to see any tendency toward backward steps in a matter as important as this. Dr. Birch brought up the symbol of the doughnut. I think what we ought to do is to look upon this more like we looked upon tuberculosis. Our problem is the strengthening of the means that we have in order to effect the purposes that we are starting out from.

That hole in the doughnut reminds me that if we follow the suggestions which Dr. Birch has made, there would be a good deal of peddling of infected cattle from state to state. People cleaning up their herds, many of them, want to get rid of those animals, and speculators who can buy them up cheaply, gather them into bunches and ship them out into other states. So we ought to close up that hole in the doughnut so they can't slip through. Our regulations should be strengthened rather than slackened on this matter.

One gentleman told me of a county in one of the southern states where they had done a lot of testing. The reports came back that they had only three animals in that county affected with this disease. There is a big interest, a growing interest, in the development of dairying in the South. Those people don't want to get into the condition of some parts of Missouri, Iowa, Wisconsin and maybe New York. Those infected animals ought to stay at home. There ought to be no means whatever that would permit those infected cows to get away from the farms where they were bred and where the owner knows how to handle them and go off into other states and start new infections in clean territory.

We should not take any backward steps. Our problem, as I see it, is to make this test more perfect and make the men who apply the test more efficient. That, I think, is the main point. (Applause)

DR. R. R. BIRCH: I think that Dr. Connaway and I are essentially agreed in relation to the desire to protect these sections. We must remember that we do not have very many sections of that kind. I think if it can be demonstrated that there is such a section, it would be well to prevent the shipping of any cattle into it. The thing I want to call attention to is the fact that shipping these clean cattle on individual tests into that territory would be one of the most certain ways to produce disaster in that territory that could possibly be devised. I can handle matches at one time and powder at another, but when I put them both together I get an explosion. That is about the way this will work.

When breeding cattle can be shipped into that district to build up those herds, that is fine, but that district will certainly become infected if animals are bought on individual tests from infected herds and sent down there. Also, the animals themselves as well as the district will become infected. I have said that we should remember this has an educational feature connected with it. A breeder buys cattle which he says are tested and approved by the state, and he believes that he is giving himself the maximum protection. There really is no way to protect a district or a breeder except to teach him how to protect himself. It isn't entirely clear yet whether the benefits that come from a law of that kind overshadow the harm which may come in that regard.

DR. PETER MALCOLM: I don't want you to accept the impression that has been put out here today that twenty per cent of the herds of cattle in the state of Iowa are infected with contagious abortion. You will notice from the figures that were put out here today that a very small number of herds were tested. Those herds were tested on account of undulant fever being reported, as the result of the milk supply that the patient used. I do not believe it is fair, with that small number of herds, to say that the herds of cattle in the

state of Iowa are twenty per cent infected, when we have in the neighborhood of pretty close to 100,000 herds of cattle in the State. That means individual cattle-owners. A man who owns one cow or two cows is represented as a herd-owner.

The Iowa legislature passed a law requiring the agglutination testing of all dairy and breeding cattle before they were brought into the state of Iowa. I am proud to say that the legislature of the state of Iowa and the farmers of the state of Iowa can read. They have been reading their newspapers and farm journals and notice what has been done and said about the research work in this connection. To protect themselves against the importation of cattle that reacted to the Bang abortion disease was the reason they passed that law. The legislature of the state of Iowa is about eighty per cent farmers, and, as I said before, the farmers can all read. They have sense enough to protect themselves. That is the reason that law was passed.

We have no trouble in Iowa in getting the cooperation of the cattle-owner. He is very anxious that the cattle he buys, that come from other states, pass this test. He is wise enough to know that if he is building up a good herd it is not a good thing to put these cattle into his herd until he has his own herd tested, and a great many of them are doing that. That is the explanation. (Applause)

DR. J. M. SUTTON: In fairness to the raw-milk producers I want to ask Dr. Kern a question. If I understood his statement correctly, he said that not a single case of undulant fever in man had been traced directly to the drinking of pasteurized milk. I would like to ask him if there has been a single case that has been directly traceable to anyone drinking raw milk; also if the health authorities have eliminated the possibility of the human element being one of the main factors in the transmission of this disease.

DR. KERN: In regard to the question as to whether cases have been transmitted by raw milk, the answer to that is yes, not only raw milk but certified raw milk. I have seen such cases. The milk was not certified as to abortus infection specifically, although such herds are now coming along, but I have seen undoubted cases of that.

As far as the human element is concerned, I suppose you refer to the question of transmission from man to man. There is no evidence as yet of any case of transmission from man to man. That it should occur is probable, but certainly not so likely as in the lower animals, for the simple reason that infection of the generative organs of man is extremely rare as far as clinical cases have been reported.

There is one thing I want to say from the standpoint of the medical aspect of this problem. We of the medical profession have had as our major work the dissemination of information among doctors that this condition exists. To you that seems a surprising thing. You are in contact with it all the time. But you would be amazed how many doctors there are in the country today who haven't the slightest notion about it.

The largest number of cases of undulant fever has been reported in the state of Iowa, not merely because there are ten and one-half million hogs there, a lot of which are infected, but because the State Department of Health in Iowa has carried out the best educational campaign among its medical practitioners. Go to the neighboring state of Nebraska, right across the state line. They undoubtedly have a flock of hogs over there, I don't know how many. They undoubtedly have abortus infection in that group, yet up until the first of this year there were reported only nine cases of undulant fever in the state of Nebraska. Do you believe that is all there are there? I don't. (Laughter and applause)

DR. SUTTON: I would like to ask one more question. They have demonstrated definitely that undulant or Malta fever has been transmitted through the drinking of raw milk. Don't you think it would be a good plan if the health authorities could say whether or not the human element is one of the main factors in the transmission of this disease?

DR. KERN: That is a question that I think cannot be answered with our present state of knowledge. All I can say is that in all probability the human element is proportionately small. It is extremely unusual; for example, in my own limited experience, which amounts to about a dozen cases, I have

never seen two cases in one household. Where there were outbreaks in any particular place, human outbreaks, they have been associated with an outbreak in the cattle on that place that have lit up the human infection. So I don't see that we can do anything or say anything definite about such remote means of transmission.

PRESIDENT WIGHT: I will now call on Dr. Robert Graham to discuss this question.

DR. ROBERT GRAHAM: Mr. Chairman and Gentlemen: In drawing to a close this splendid discussion on Bang disease, I feel as in previous years that there is a growing appreciation not only of the work that this organization is doing by disseminating information and exchanging ideas, but the imprint that the discussions make is being carried out onto the farms in this and other states. As I visualize the discussion today, the most important thing to me is that the Committee as well as the different essayists have divided for us in a rather definite way the experimental effort which is necessary and which challenges us in completing this work. It has left with us that plan of sanitation and testing, which we all know has grown in various localities.

In 1922 we tested in an experimental way a rather large herd of dairy cattle. This herd was rather badly infected. It had furnished the material to Dr. McNeil and Dr. Kerr in their investigations. Nothing was done in the way of controlling the disease except to try out certain therapeutic agents. Incidentally, I rather look upon that period as well as some few years that followed in this problem as, if you will permit me to say, the "bunking" stage, because we were trying various things with the hope that some good might be accomplished.

I think through the live stock sanitary organizations and the reports that they have presented, we are now well into the "debunking" stage, if I may speak of it in that way, where we have something more sound, more practical for the cattle-owner.

In this herd that I refer to, twenty-five per cent reacted on the initial test. The succeeding test a few months later yielded another twenty-five per cent. We felt very much discouraged and called in people who had had more experience than we had in dealing with this problem. Today there are 439 herds in this state under that sanitation and testing plan in seventy-four counties. There are 102 counties in Illinois. That to me is a straw which shows us the trend of thought at least among the owners of cattle. I do not feel that every herd which we have encountered is going to make one hundred per cent progress under this plan, but I do want to leave the impression with you that in our limited experience, in the plan of procedure, namely sanitation and testing, the technic has not been the limiting factor. I personally believe from observations made that it is the individual owner, because a certain owner with a similar problem, or his neighbor, will build a free herd successfully because he has the will to do.

I think back of that (and the thought has been expressed here many times today) we must have in the management of these herds, the ownership of them, a clear understanding of what and how the job is to be done.

Of these 439 coöperators in this project (and they have enlisted their herds voluntarily) one has discontinued. He could not resist the salesman who could solve his problem by feeding some mysterious remedy. The increase in the number of coöperators that I refer to has come about largely through the influence of cattle-owners themselves. I think I can tell, and it has been checked up, where certain men have been cattle-owners in the State, from the character of the correspondence which comes in. It is a project, in other words, that they have carried on themselves, very largely. I have seen or observed some of these badly infected herds cleaned up, I mean herds where there has been sixty per cent infection, and where this plan of salvaging the calves and maintaining certain blood lines has been successful. I have seen the plan rather skeptically, as I mentioned at first, employed in large herds and, of course, the method of disposing of reactors has been an important factor in the progress of cleaning up the herds.

As a result of this effort, there are now, according to the figures of the State Department of Agriculture, twenty-nine herds of varying size that have passed two annual negative tests. I believe from observations made

that the investigational aspects mentioned, the possible values of chemotherapy and vaccination should continue to attract the attention of the federal and state experiment stations, but I do have a feeling that if we are giving the maximum service to the live stock industry, the dairy and beef cattle herds of our state, the plan of sanitation is one really worth while, its limitations depending upon the way the herd is to be handled, the value of the animals and, most of all, upon the knowledge the owner has of live stock sanitation and his willingness to apply it. (Applause)

MR. W. H. ALLYN: I think my good friend Dr. Kern who, I have discovered since I came here, was a classmate of mine in the University of Pennsylvania, has been rather unfair to the certified milk producers. The certified milk regulations that have been in effect for some years forbid the production of certified milk from other than abortion-free herds as shown by test. So the reflection, it seems to me, in the case he refers to, is on the medical profession surrounding the certified herds in the section he is referring to, rather than on the certified herds. Not a single case of undulant fever has been traced to a certified herd that was living up to the regulations, or to any producer of raw milk from abortion-free cattle by test. I don't think it will be so shown. (Applause)

The session adjourned at 4:50 p. m.

THURSDAY MORNING, DECEMBER , 1930

The third session convened at 9:30 a. m., President Wight presiding.

PRESIDENT WIGHT: I am informed by the Secretary that the Executive Committee passed a motion providing for the appointment by the President of a committee of three members of the Executive Committee, to be known as the Nominating Committee. At this time I shall appoint the following:

Dr. W. F. Crewe, Bismarck, N. D., *Chairman*

Dr. William Moore, Raleigh, N. C.

Dr. T. E. Munce, Harrisburg, Pennsylvania.

Those three men will constitute the Nominating Committee and will bring in nominations for officers for the ensuing year.

Dr. Dyson has made arrangements this year, as last year, to have a little time devoted to an informal discussion. Mr. Mark Thornburg, Secretary of Agriculture, of Des Moines, Iowa, has consented to take charge of this discussion. At this time I will call on Mr. Thornburg whom you all know very well. (Applause)

Mr. Thornburg took the chair.

CHAIRMAN THORNBURG: Mr. President and Gentlemen: I don't know why the Program Committee picked on me to preside over this session. I understand this is the second session of this kind that you have had. I suppose one reason they picked me was because Joe Mercer got through all right last year, and they thought maybe another layman might be able to wiggle through this year.

I haven't tried to work up any program. There are some things that I personally am interested in and that I should like to have discussed. There is one thing I have often thought about, that I think we should try to do as an Association, and that is to get more of our live stock breeders to our meetings, more laymen. I think it would be easier to disseminate the information that we gather here if we just had a few of our breeders and live stock men present. How to do that, I don't know. It may be that that has been before your sessions heretofore.

As your President has told you, this is an open meeting. The Chairman is ready at any time to recognize anybody who wants to make a speech. You remember the old revival meetings; they always had a short period for testimonials. This is your meeting. I am going to turn it over to you.

Over at the animal husbandry meeting last week, they had quite a long discussion over the losses of feeder cattle in transit through the yards, which was quite interesting to me from what I have heard. I wasn't there but I heard about it. That is a subject that somebody might discuss.

Dr. Kinsley, you have had a lot of experience in the yards in the handling of cattle in transit and the loss on feeder and stocker cattle in transit. Maybe you can tell us something about that.

DR. KINSLEY: Mr. Chairman and Gentlemen: Relative to shipping fever in stocker cattle, first let me say that perhaps the disease has been called incorrectly many times, as far as our experience is concerned. It has been called "stockyard fever" by many people. As a matter of fact, the disease occurs in hundreds and thousands of cattle that do not enter public stockyards while in transit, so that the stockyards are not or should not be incriminated as the source of this particular difficulty.

We have seen it occur in cattle, particularly young stock, that are hauled in trucks from one ranch or from one farm to another without ever contacting a public market or contacting a railroad live stock car. So it is not really a railroad problem, it is a problem of transportation, as far as we understand the malady.

This malady is more prevalent throughout the Central West in the younger cattle. It is, I believe, most prevalent in calves that are just taken from their mothers. While in transit those calves will bawl considerable, and perhaps because of the opening of the mouth and the inhalation of dust, they seem to become more susceptible, or at least more frequently diseased when they reach destination or a few days thereafter.

As to the cause, after checking up and taking the results of the investigations from various sections of the country, it is quite evident that there are some very important predisposing influences that are really at the base, or are the primary cause of so-called shipping fever. First and foremost, it is my judgment that improper feeding and watering of cattle both before they are loaded for shipment and while in transit and after they reach a public market, if they go to a public market, are very important factors in the causation or occurrence of shipping fever.

Just let me give you a picture. Here comes a shipment of yearling cattle to a public market. They are consigned to a commission firm. They arrive perhaps on Saturday evening or Sunday morning. Water is withheld from those cattle until the following morning. They may not have had any water for twenty-four or thirty-six hours prior to the time of arrival at the market, so that we have a period of anywhere from forty-eight to possibly seventy-two hours without those animals having an opportunity to consume water. You know why they are held off of the water. It is so they can get their fill on Monday morning prior to sale.

All right, they are filled on Monday morning. The trader comes along and purchases those cattle. Perhaps he holds them two or three days and gives them two or three successive fills. Those cattle then have a great opportunity to be involved with digestive disorders of various kinds, just indigestion, if you wish to call it that. In other words, their resistance has been diminished because of the method of handling.

The same thing applies to cattle that do not go to public markets, that is as far as feeding and watering. We find some instances in which a feeder or a shipper of cattle will not feed or water for many hours prior to loading. Those cattle go on. They may be hungry. They will go through far better than the shipment that is fed and watered just prior to being loaded. So there is much concerning the management of these cattle that we believe is the important or the primary predisposing influence to the so-called shipping fever.

In my judgment there isn't any question of what happens after these predisposing influences have affected the animal. There is a variety of infections, hemorrhagic septicemia, streptococcus, diphtheroids, and this and that and the other, all of which are more or less universally distributed and are in the animals, perhaps, that have their resistance diminished. Just as soon as that resistance is diminished, these infections gain a foothold; hence, your losses.

Gentlemen, I have started it; you finish it. (Applause)

CHAIRMAN THORNBURG: The meeting is yours, gentlemen. These open sessions should be the best parts of the program. I am frank to say I am not well enough acquainted with the personnel here to really call on individuals. I see one of the Commissioners of Agriculture from Wisconsin is here. He is quite a live stock man. I don't know whether he has anything to say to us at this

time, but I want you all to know him and get acquainted with him. Mr. Rink from Wisconsin. Haven't you got something to say to this meeting?

MR. RINK: I just dropped in casually this morning to get acquainted with some of the men. I don't know of anything particular to say further than that we have a live stock remedy law in operation in Wisconsin. It has been in operation the past year. I was wondering how many states in the Union have adopted that law, and whether it is working out successfully with them. I think it has done quite a bit in Wisconsin in keeping some of the quack remedies off the market, and I believe that it is the proper thing. I was just wondering whether it is being adopted generally in other states in the Union.

CHAIRMAN THORNBURG: I presume quite a number of states have live stock remedy laws. I don't know whether they are the same as in Wisconsin. Is there anything else you want to bring up in this open session?

Mr. Harmon, one of the editors of one of our meritorious farm papers has been attending the meetings here all week. Have you anything to offer to this Association?

MR. E. M. HARMON: Mr. Chairman, the question that was brought up first is one that I think I heard all the discussion on in the American Society of Animal Production. It is a serious one to live stock feeders, and especially so, apparently, in the East.

I am not enough of an authority, not enough of a veterinarian to know what the solution is, but I do believe that some good could come out of the suggestion that Mr. Thornburg has made to us, and that is closer coöperation, especially in these meetings, with live stock men themselves.

The second point that has just been raised, namely a lot of these fake remedies, is one that perplexes editors of farm papers, I believe, just as much as it does anybody else. I went so far, a little while ago, in talking with Dr. Hallman and some others, before the meeting broke up, as to suggest that a lot of us would welcome criticisms from the veterinary profession and from the U. S. Live Stock Sanitary Association. I can't speak as a representative of the Agricultural Editors Association on this, I haven't been authorized to do that, but I can speak, as the representative of one farm publication, in saying that we would welcome such a thing as a censorship committee from the U. S. Live Stock Sanitary Association in the matter of passing on a lot of these remedies, and particularly in the matter of passing on the publicity and the advertising that is presented. It is a real problem that farm papers are facing. We all know that it is one of the best means by which a lot of fake remedies and nostrums get themselves before the farmer.

This suggestion may be entirely out of order, but I can say for one organization that we would greatly appreciate being able to coöperate with such a committee from your own group.

MR. CALDWELL: Director Richardson, of the Bureau of Animal Industry of Massachusetts, is with us. He is very much interested in stockyards conditions. He has charge of the sanitary conditions in the Brighton stockyards, which is the largest dairy cattle market in the United States. I think perhaps you would like to hear from him.

CHAIRMAN THORNBURG: We would like very much to hear from Mr. Richardson.

MR. E. F. RICHARDSON: I don't know any reason why I should attempt to say anything to an audience like this. I have been on my job for less than two and one-half years. I come from the good old state of Massachusetts. All you fellows who have been coming there all this year, helping us celebrate our three hundredth anniversary, discovered the reason for our greatness. It amuses me when I meet people from other states, especially California or the Middle West or down in Texas, they are always talking about their state. We people in Massachusetts don't say very much about our state; we don't have to; we have the goods.

We claim in Massachusetts that we lead in all state work. We have commissioners come to our state to study our methods. But I was very much surprised and a good deal chagrined when I was appointed to this office as Director of Animal Industry, to find that the state of Massachusetts stood right at the bottom, way down at the bottom of the list of states in cleaning up on bovine tuberculosis. I couldn't understand it.

I want to tell you that in the last two years we have been coming faster than any state in the Union. We won't be the fourth state, perhaps, to go over 100 per cent, but we will be along pretty soon. Everybody is interested; the farmers are interested; the consumers are interested. We are going to clean up bovine tuberculosis in the state of Massachusetts. This year on the first test we had from 35 to 40 per cent infection. You can see what that means to a state like Massachusetts with so many infected cattle. It means a lot of money. We have to pay the bill. It is going to cost the management a lot of money to clean up, and we are going to clean up. Our problem is greater financially than yours, but we are going to face it. We are getting certain localities cleaned up, and we are coming along.

With reference to the Doctor's statement, when I went around to the farmers' meeting, they said, "Why don't you close up Brighton? It is rotten. It is breeding disease." I knew it from my own personal experience. I was a dairy farmer, and I kept buying my replacements from the Brighton market. All I was interested in was to get a good cow that would give a lot of milk. When I had my herd tested, I lost every cow, and they all came out of Brighton. I could see a reason for their question, "Why don't you clean up Brighton?"

We have done a lot to improve the conditions at Brighton. We have probably 15,000 to 18,000 dairy cows that go through Brighton market every year, and that is the biggest supply in our replacement problem. We probably have in Massachusetts around 30,000 replacements every year.

Here is another thing that seemed rather funny. Some of the farmers that were opposed to the tuberculin test, the opponents, would say, "It is driving the farmers out of the business; it is killing off all the cows." Do you know that in two years we have killed off about 10 per cent of the cattle population in reactors and we have a little less than 50 per cent under supervision. We have some way to go. At the same time, we have increased our cattle population by almost 10 per cent. In other words, we have made the replacements in Massachusetts 20 per cent; the cattle population has increased 10 per cent, and we have killed 10 per cent. That indicates that the dairy towns in Massachusetts are keeping a better grade of cows and doing a better business than they ever did before. I am interested in this work. I am glad this day is devoted especially to the bovine tuberculosis problem.

I am only a farmer, but I want to tell you that as far as my experience with veterinarians is concerned, there isn't a better profession that I have ever been acquainted with. They have been of great help to me in my state. (Applause)

DR. H. PRESTON HOSKINS: If I am not out of order, I would like to revert to the speaker who preceded Mr. Richardson. I believe it was Mr. Harmon. He made a suggestion that this organization might provide a committee that would function as a censoring committee, to coöperate with the publishers of agricultural papers for scrutinizing a little more closely the advertisements that are submitted to them, the advertising of proprietary remedies, quack nostrums. I have no objection to this organization providing such a committee, but I do want to direct the attention of Mr. Harmon and others to the fact that the American Veterinary Medical Association already has such a committee. It is a going concern, has been functioning for three years, and has been doing just exactly the thing that Mr. Harmon has said he would like to have done. I refer to the Committee on Proprietary Pharmaceuticals, headed by Dr. H. D. Bergman, Iowa State College, Ames, as Chairman.

The major work of that Committee during the three years of its existence has been to give advice to the publishers of farm papers on the advisability, or otherwise, of accepting advertisements of some of these remedies which are being foisted upon the owners of animals. Even though the Committee does not have available any laboratory facilities of their own for making analyses of any of these preparations that are being offered, it has been found possible to secure these analyses. The recommendations and the opinions that are given to the agricultural papers are based upon these analyses and the opinion of the members of the Committee as to their probable efficacy or otherwise.

I simply wanted to bring to your attention that there already is a committee that is functioning in that capacity, the Committee on Proprietary Pharmaceuticals of the A. V. M. A.

MR. HAUPT: In looking at the first page of the program we notice this is the thirty-fourth annual meeting of this Association. We might wonder what was the cause which led to the first meeting of this Association. We do know that at the time contagious pleuro-pneumonia was prevalent in this country, there was no uniformity of state regulation or state action with regard to the control or eradication of that disease among domestic animals.

We know that on account of the lack of uniformity, the lack of coöperation with the new Bureau of Animal Industry which had been established only three or four years before, and on account of the lack of coöperation between the states themselves, the eradication of that contagious disease was deferred at least five years.

Following the eradication of contagious pleuro-pneumonia, there continued to be a lack of uniformity in state regulations and state action in regard to the protection of the live stock industry. That continued, and state officials met from time to time; at least one or two of these officials from the different states would meet from time to time to discuss the various problems. Finally there were meetings called in sections of the country to discuss their problems, and this organization was established for the purpose of bringing together state officials and others to discuss the problems of mutual interest to the states.

That was the purpose of this organization in the first place. Gradually we have drifted to a more literary and scientific program.

I remember about two years ago, I was attending the Executive Committee meeting and suggested that there should be a period set apart in the program to give the state officials an opportunity to discuss their problems in open session. So that, I think, was the real origin of this period on the program, to give state officials an opportunity to discuss their various problems and bring up problems that are facing them so that they can obtain the expression of sentiment from the other state officials. I hope that it will continue because I believe that it gives an opportunity to state officials to express themselves, and it is carrying out the original purpose of the organization.

CHAIRMAN THORNBURG: Our President seems to think that we should go ahead with our regular program, so I am going to turn the meeting back to him. Thank you. (Applause)

President Wight resumed the chair. . . .

PRESIDENT WIGHT: Thank you, Mr. Thornburg.

We change now to the topic of Swine Diseases. To start with, we are going to hear from Dr. I. K. Atherton, inspector in charge of hog cholera in the state of Maryland. (Applause)

Dr. Atherton read his paper, "My Experience with Hog Cholera."

MY EXPERIENCE WITH HOG CHOLERA

By I. K. ATHERTON, College Park, Md.

The advancement and accomplishments of the veterinary profession in the United States thrill every veterinarian with pardonable pride. However, it is my candid opinion that this profession is not in a position to indulge in much whoopee over the efforts it has made to prevent the introduction, harboring and spread of the hog cholera infection.

In fact, instead of any effort being made to prevent the spread of the disease, many veterinarians, as well as hosts of animal

husbandmen, are encouraging and aiding in the dissemination of the virus in every conceivable manner with the abandon of a candidate for a political office dilating on the short-comings and wickedness of his opponents.

In 1878, two veterinarians, Dr. James Law and Dr. H. J. Detmers, began a series of investigations of hog cholera at the request of the United States Commissioner of Agriculture. A close study of the report made by Dr. Detmers will convince any thinking man that, considering the status of veterinary science of that period, the work done by these gentlemen was of great credit to our profession, and they found out much regarding the disease that still stands as part of the available knowledge of the malady which we have today. The conclusions reached and the recommendations made by Dr. Detmers were definite enough to have stimulated an offensive campaign against cholera. They are as follows:

A radical extermination is the only thing that will be effective, unless it can be proved that a spontaneous development is taking place, or can take place, within the borders of the United States. No authenticated case of a spontaneous development of hog cholera has yet come to my knowledge, and the disease, I am more convinced than ever, can be stamped out. But the measures of extermination or stamping out must be thorough. Anything undecided, doubting, hesitating, or wavering and favoring, will be of no avail, but will only tend to prolong the existence of the plague and increase the cost.

Instead of any attention being given to these recommendations, only a comparatively few years had elapsed before our scientists were endeavoring to work out a plan whereby we could live with the disease instead of making even a feeble effort to follow the advice of Dr. Detmers and get rid of it. During the declining years of the last century, the idea of using biologics to beat the undertaker out of a job was becoming popular, and why not try it on the hog?

Early in the present century, Dr. Marion Dorset and his co-workers accumulated undying fame by the marked progress they made regarding the disease. About 1903, they determined that the causative agent was a filtrable virus, and from then on their accomplishments read like a fairy tale. By 1908, they had developed and given to the country the two biologics which were to mean so much to the swine industry—anti-hog cholera serum and hog cholera virus.

The erroneous belief was then generally accepted that any one could, without danger, double-treat swine and immunize them against the disease for life, and that this rendered further pre-

cautionary measures unnecessary. Thus the wonderful advantages of this great discovery were largely lost, for the reason that sanitary measures to prevent the introduction, harboring and spread of the infection were ignored. On the contrary, methods of swine management which are known to be not only responsible for starting new outbreaks of cholera but maintaining centers of infection as well, were and are still being recommended and practiced.

In this connection I wish to quote from a statement made by Dr. Dorset at the annual meeting of this Association in 1926. The quotation is as follows:

I think we will have to recognize that we cannot expect to eradicate hog cholera by the use of serum or by vaccination. This is not an agency to be used for that purpose; it is not to be used to eradicate it, but to control the losses from it. That is the particular function, as I see it, of anti-hog cholera serum, to control the losses from the disease.

This, I believe, is a most illuminating statement. In other words, serum is to prevent losses from hog cholera, but not to prevent the spread of the infection. There never was a disease controlled or eradicated without first controlling the dissemination of the causative agent, and hog cholera will not prove an exception. Can we as sanitarians and official veterinarians, charged with the responsibility of the protection of the swine industry of this country, be content with efforts, on one hand, at keeping down losses, while with the other, we are disseminating the virus as lavishly as a flapper imbibing chocolate sundaes.

In view of the light of present-day knowledge of the science of sanitation, I wish to register an emphatic protest against the use of that old stock statement, "Immunization is the only known means of preventing hog cholera." If a member of my force used this statement without qualifying it by the addition of "when the animals have been exposed to the disease," I would hang my head in shame. The prevention of hog cholera is more or less a farm management problem, and the sooner this is recognized, the better for all concerned. If a farmer's hogs contract cholera, it is, in most instances, his own fault, and there is no excuse for his permitting the spread of the infection from his place.

AN INCORRECT STATEMENT

In this connection I wish to condemn the use of the statement, frequently seen in newspapers, to the effect that hog cholera is spreading in such and such a locality. Nothing could

be further from the truth. When the disease is prevalent in a locality the statement regarding it should be to the effect that the swine-owners in that locality *are spreading* hog cholera infection. When an outbreak of hog cholera occurs it is due, without exception, to some human agency which could have been controlled. Efforts have been made to blame the sources of infection on everything from voodooism to the Eighteenth Amendment, but the fact remains that, excepting those hogs which have received virus through a needle, practically all that have contracted the disease have picked up the infection with the food or drinking water. In other words, the natural channel of infection is through the mouth.

In 1916, in his presidential address as presiding officer of this organization, Dr. O. E. Dyson devoted one short paragraph to hog cholera. However, in that limited statement, he surely said a mouthful. In fact, he spoke volumes, and I believe that if effort were made to heed his advice, the hog cholera problem would be solved. It gives me a thrill now to quote his statement:

The greatest problem now confronting swine-breeders throughout the United States is whether or not the contagion of hog cholera can be controlled. The mere fact that annual visitations of hog cholera with its attending losses have heretofore been looked upon by the average breeder as being inevitable, should by no means be permitted to establish the mistaken belief that the contagion of hog cholera would fail to yield to modern sanitary control, the application of which would limit the movement of cholera-infected swine, require the cleaning and disinfection of infected premises, railway cars, loading-pens, chutes, etc. There is no more reason for permitting the unrestricted spread of the contagion of hog cholera from infected herds or premises than to ignore the fact that hog cholera is an infectious disease.

The real import of Dr. Dyson's summary of the solution of the hog cholera problem can best be fathomed by an analysis of the sources of infection in the primary outbreaks of the disease. It must be admitted that new centers of infection are the crux of the whole problem, for without them there would be no secondary outbreaks or spread of the infection to the swine on nearby premises.

INFECTED HOGS CHIEF SPREADERS

One of the first things found out about hog cholera was that an infected hog was the surest transmitter of the disease, and in some localities this is undoubtedly the most important source of infection. Every farmer is aware of this, but it is problematical just how many profit by this knowledge. Probably every veterinarian here today, who has had any experience with swine practice, can recall one or more instances where persons have know-

ingly purchased hogs that were sick with the disease. Instances are legion, where hogs that are clinically ill are shipped for slaughter and animals that have been exposed to the disease are, after treatment with serum and virus, transported to distant points for admission to feed-lots.

In the summer of 1929, questionnaires, asking for data pertaining to hog cholera, were sent to more than 700 veterinarians in eleven of the middle western states. Replies were received from approximately 40 per cent of those to whom they were addressed. Information gained from these showed that the introduction of infected hogs was the most prolific source of new outbreaks. In fact, it was responsible for approximately 44 per cent of all new or primary cases of the disease, in the eleven states. The records of the hog cholera work in Maryland for the biennium ending September 30, 1930, show that approximately only 6 per cent of the new outbreaks were caused in this manner. However, there is not much traffic in stock hogs in that state.

INFECTED PORK SCRAPS CARRY DISEASE

For many years, losses among garbage-fed hogs were supposed to be due to lye, washing compounds and soap powders in the garbage. About 1910 our Canadian cousins got the idea that cholera was the real cause of such losses, and they insisted that our Uncle Sam was sending them the infection nicely wrapped up in a pork rind. Like all good neighbors, we insisted that our pork scraps could not be guilty of carrying such a flask and mildly intimated that our friends, on the refreshment side of the boundary line, were suffering from a brain storm. However, after experiments were carefully conducted, it was found that bones, rinds or scraps of pork from hogs affected with cholera, even in the incubative stage, would prove infectious if fed to susceptible hogs.

Just how much of a factor, in starting new outbreaks of cholera, infected pork is proving to be is an interesting point. I deem it regrettable that greater effort is not made to collect such information. The questionnaires returned by the western veterinarians in 1929 showed that approximately 16 per cent of all new outbreaks in the eleven states were caused by this agency. However, it is my opinion that, if a systematic effort be made to collect data on the outbreaks of cholera in the Corn Belt, this estimate will be found to be too low.

From the available evidence it would appear that infected hogs, infected pork and the abuse of the double treatment, which I will discuss later, are the three principal sources of infection in new outbreaks of cholera. A fourth has never been suggested. But if others are discovered later, I will gamble that they will be of minor importance and that they are due, also, directly or indirectly, to the movement of hogs from infected herds or premises.

With these facts before us, it is obvious that the solution of the hog cholera problem lies in a coöperative movement on the part of the several states and federal government to prevent the intra- or interstate movement of swine that originate in infected herds or on infected premises. As immunization is only incidental to the promiscuous dissemination of the infection, the correction of the movement of infected animals would ultimately solve the abuse of the immunizing virus.

There might have been a time when the movement of infected swine to market was justifiable. Before the development of anti-hog cholera serum, the introduction of hog cholera infection into a herd practically always meant a 100 per cent loss. But, granting that such an emergency did exist, it has long since passed. Today, with a plentiful supply of serum always available, the owner can, by prompt recourse to vaccination, reduce the losses to a minimum. It is my opinion that no swine should be permitted to be moved from any premises on which an outbreak of hog cholera has occurred until it is evident that all animals are free of the infection and the premises have been cleaned and disinfected under the supervision of an official veterinarian.

SERUM AND VIRUS SHAMELESSLY ABUSED

I do not believe there is a person here today who will question the merits of anti-hog cholera serum and hog cholera virus as immunizing agents when they are properly prepared and preserved, as well as intelligently used. Moreover, with the large number of reputable firms preparing and distributing these biologics, I do not believe that any registered graduate veterinarian in the United States is in a position to use the worn-out term, "poor products," as an alibi for bad results following the administration of the double treatment. However, I do not know of any biologics that have been and still are being as shamelessly abused as these two.

Even when the virus is used judiciously in the simultaneous treatment, an occasional hog dies. Therefore, it is obvious that when ignorance, carelessness, or selfishness is the dominating factor behind the syringe, dire results will follow. Everyone present realizes that hardly a day passes, but new centers of infection are started by the improper use of virus. The questionnaires heretofore referred to, which were received from the veterinarians of eleven western states, show that abuse of the double treatment was the second largest factor in starting new outbreaks of hog cholera in that territory. In fact, the data derived from these questionnaires show that approximately 40 per cent of the new outbreaks were started in this manner. However, farmer vaccination was the main source of the trouble. While the abuses of the double treatment would furnish thought for an afternoon's lecture, yet there are two which I think are the most important, and which I wish to discuss today. They are farmer vaccination and administration of the double treatment to hogs that are in an unfit condition to receive it.

Farmer vaccination is spoken of with an antipathy toward the offenders as if they were really to blame. However, it is my opinion that the hog-raisers have been victims of circumstances. They were first given to understand that vaccination was the only measure whereby hog cholera could be controlled. Next, they were impressed with the idea that virus was a safe thing for the children to play with. In addition, tons of literature have been broadcast giving instructions how to inject serum and virus into hogs, but the soft pedal has usually been put on the dangers of the treatment. I have in my office copies of forty-seven official bulletins on this subject, intended for the use of laymen, all of which were written by veterinarians.

Right here, I wish to quote a short paragraph from the versatile pen of Dr. L. A. Merillat.

Although outflanked by arguments which appeal to the farmers, it is evident that the plain duty of the veterinarians is that of driving home the real facts until both those who are misinforming the farmers and the farmers themselves understand them. Farmer vaccination of hogs is only a mistake—that of the swine industry. It is a departure that turns the whole system of animal-disease control in the wrong direction.

The administration of the double treatment to swine the vitality of which has been lowered and which are unfit to receive the treatment, is undoubtedly a prolific source of infection. Every veterinarian here will unhesitatingly condemn such practice. However, there is another phase of treating such hogs

regarding which I wish to leave a thought with you today. In the last fourteen years, a number of alleged new diseases of swine have become prevalent in the Corn Belt. Some of these, so I have been informed, are proving a greater menace to the swine industry than hog cholera. We frequently hear them referred to as filth-borne diseases. But I am wondering if this is always true. In Maryland, where very little double treatment has been used for many years, we never hear of these conditions, and I believe we have many hog-lots in that state as filthy as any that can be found in the Central West. A California veterinarian, Dr. Robert Jay, has offered the following theory regarding organisms which were leading a harmless existence on the mucous surfaces of hogs and are found, after administration of virus to the animal, to be invading the tissues of the hog and becoming pathogenic. Dr. Jay's theory is as follows:

Various microscopic forms of life are found upon the skin and mucous surfaces of normal hogs. Among those which have been isolated and identified from mucous surfaces are *B. suisepiticus* and *B. suispestifer*. While the mucous surfaces are intact, these organisms do no apparent harm to the hosts. . . . It would seem that the filtrable virus plays the part of a primal or predisposing cause by so injuring the mucous surfaces as to make them permeable to organisms which are already present.

Experience has taught every veterinarian engaged in swine practice that there is practically no danger in administering the double treatment to healthy swine. However, an animal, the vitality of which had been lowered, would not only be more susceptible to hog cholera, but undoubtedly would be harboring many organisms from which healthy hogs would be free. If Dr. Jay is correct, this may, in a large measure, account for the prevalence of the alleged new diseases of swine, and unquestionably renders a careful examination of hogs necessary before they are given the double treatment.

Ninety-seven years have elapsed since the disease under discussion was introduced into this country, yet, according to a writer on live stock subjects, "Hog cholera remains a death stalker without rival in the live stock industry." Anyone who is familiar with the live stock situation realizes that this statement is true. Accomplishments in the prevention of this disease have been anything but creditable to our profession. Moreover, unless more radical action is taken to prevent the introduction, harboring and spread of the infection and to control the use of immunizing virus, there are official veterinarians in office today who will remain there long enough to rue the inertia. However, the change cannot be brought about over night. Neither is it a situation that can

be corrected by the simple enactment of a law. To produce the desired results will require an incessant campaign of education. It will be necessary to familiarize the farmers and stock-raisers with the manner in which the infection is spread, and what they can do to prevent it. They must understand that their coöperation is essential to the eradication of the disease.

Our course is plain. Our duty is imperative.

PRESIDENT WIGHT: The next will be the report of the Committee on Communicable Diseases of Swine, to be presented by the Chairman, Dr. F. H. Brown, State Veterinarian, Indianapolis, Indiana. (Applause)

Dr. Brown read the report.

REPORT OF COMMITTEE ON COMMUNICABLE DISEASES OF SWINE

DR. F. H. BROWN, *Chairman*, Indianapolis, Ind.

Dr. R. R. Birch, Ithaca, N. Y.

Dr. C. McCandless, Columbus, O.

Dr. I. K. Atherton, College Park, Md.

Dr. C. H. Hays, Lincoln, Nebr.

Swine diseases other than hog cholera continue to attract increasing attention. There has been no alarming change in the situation with respect to these diseases during the past year. Some states report apparent increases in necrotic enteritis, infectious bronchitis, pneumonia, pig scours, and mange, while others report that there appear to be decreases in the prevalence of these diseases. No reliable data are available from any source in regard to the prevalence and mortality of diseases of swine in this country other than cholera. Evidently the extremely hot, dry weather in drought-stricken districts retarded increases in the prevalence of the common diseases, especially those regarded to be of filth-borne origin.

PARASITES

Drought conditions this year do not seem to have resulted in any decrease in the prevalence of parasites of swine. In view of the wide prevalence and increasing economic importance of these parasites your Committee recommends:

That each state employ at least one competent parasitologist to carry on basic research work on parasitic diseases, and that each state should make a survey to determine the occurrence, distribution and losses resulting from animal parasites.

Investigations carried out by the U. S. Bureau of Animal Industry have brought to light important findings on the pathogenicity of parasites and the mode of transmission of lungworms, kidney worms, and other economically important species. The investigations of the Bureau of Animal Industry should be supplemented in the various states, as differences in climatic conditions, soil and topography have an important bearing on parasite control, and more work should be done than the Bureau of Animal Industry is able to do with the funds available. The methods employed to control parasites are essentially sanitary procedures which materially aid in reducing losses and preventing other maladies of swine.

INFECTIOUS ABORTION OF SWINE

Infectious abortion of swine is attracting increasing attention both as an economic factor in swine production and as a source of infection in man. In view of the importance of this disease your Committee recommends:

That all official veterinarians engaged in the investigation of swine disease make inquiry at all premises they visit regarding the prevalence of abortion among swine and report the information they obtain to proper state live stock sanitary officials.

That the U. S. Bureau of Animal Industry and state experiment stations increase and intensify their studies of infectious abortion in swine, including its transmissibility to man and its relation to infectious abortion of other animal species.

HOG CHOLERA

Hog cholera, from a national viewpoint, continues to be the most destructive disease of swine in this country. However, according to recent reports from various sections of the country, hog cholera has been less prevalent this year than last year.

Fewer hogs were immunized than last year, due to economic conditions and the decrease in the prevalence of cholera. The unusually large number of susceptible hogs now in the principal hog-growing states places the swine industry in a similar position to that of 1926, when extensive outbreaks of cholera appeared.

It is encouraging to report that in most of the states there appears to have been a decrease in the percentage of breaks in immunity compared with last year. This no doubt is due to greater care on the part of veterinary practitioners in examining herds before administering virus in connection with serum and in refusing to administer virus to swine not in fit condition to withstand the reaction of virus.

Hog cholera has been a subject of discussion at meetings of the United States Live Stock Sanitary Association since the organization came into existence. A review of the subject shows that the various phases of the subject have been covered in reports of previous committees. Your Committee is unable to report any new developments during the past year of a character to warrant change in our present method of combating this disease. Therefore, our report will serve only to bring to your attention again in the form of recommendations some of the most important matters in connection with hog cholera and its control. Your Committee recommends:

1. That states, which have not done so already, make hog cholera a reportable disease.
2. That the United States Bureau of Animal Industry and state experiment stations continue to study hog cholera, especially (a) the ways by which the infection is disseminated; (b) its relation to other diseases and conditions which interfere with success in immunization; and (c) the relation of feeds and feeding to immunization.
3. That the shipping of infected hogs to public markets be discouraged. Realizing that the sick hog is the original source of infection and that its meat may carry active virus, federal and state regulations should impose severe penalties in the way of condemnations when consignments of hogs visibly affected with cholera arrive at public markets.
4. That rendering-plants not connected with official establishments under the federal meat inspection law be required to hold a permit and operate under the supervision of state live stock sanitary officials or a city board of health.
5. That all garbage-feeding-plants be operated under the supervision of state live stock sanitary officials.
6. That farmers be encouraged to raise their own feeder stock in order to avoid the danger attending the introduction of new stock. When it is necessary to purchase additional feeder stock, long hauls, assembling stations and stock-yards not equipped with special cleaned and disinfected pens for handling such hogs, should be avoided as far as possible.
7. That in view of the difficulty of differentiating swine ailments and recognizing those diseases and conditions which interfere most with success in immunization, the simultaneous treatment against hog cholera should be administered only by qualified, responsible veterinarians, where such assistance is available.
8. That the veterinary practitioner inform his clients relative to the ways by which hog cholera is spread, the danger from feeding kitchen garbage, the apparent advantages of immunizing pigs while young and yet likely to be free from some of the diseases which complicate immunization, and instruct them definitely in regard to the preparation of the herd for immunization, and its care, especially in regard to proper feeding, following the application of the simultaneous treatment.

9. That the simultaneous treatment be recognized as a measure for control of losses from the disease. In the application of this control measure care should be exercised in determining where and when the simultaneous treatment is necessary. Equal care should be exercised in examining all herds before administering virus to determine whether the animals are in fit condition to receive virus. The day has passed when we can safely resort to the simultaneous treatment when in doubt as to a positive diagnosis of cholera. There has been improvement in the results of immunization within the past five years due to a recognition of the diseases and conditions which interfere with successful immunization.

10. That hog-growers receive instruction in the management of their herds to prevent as far as possible subvirulent infections which lower vitality and make immunization hazardous.

11. That all concerned give due attention to sanitation and quarantine in preventing hog cholera and its spread.

12. That systematic immunization be resorted to in herds and communities where this procedure is necessary to protect the swine industry.

13. That veterinary practitioners perfect their technic, administer ample doses of both serum and virus, avoid the use of out-dated products, exercise great care in storing and handling serum and virus, especially the latter, and agree on reasonable, uniform charges for service.

14. That state authorities control the use of virus through permits. That they also investigate storage facilities of local distributors and check labels to prevent the sale of out-dated products.

Your Committee appreciates the great value of the simultaneous treatment when potent serum and active virus are used properly and where a permanent immunity is necessary, as, for instance, in communities where the disease reappears each year and in herds to which garbage is fed. It is also realized that the misuse or inopportune use of virus may result in establishing centers of infection.

So much valuable information has been acquired concerning the maladies of swine and their prevention that hog-growers may protect their herds against most of them. We have a reliable prophylactic treatment against hog cholera when properly applied, and, as for other diseases and conditions, the greater part of the losses, now suffered from deaths and stunting, could be avoided if hog-growers would apply the preventive measures which have proved of value. Prominent among these measures are the following:

(a) The adoption of the McLean County system of raising hogs. When this is not possible, a yearly rotation of hog-yards.

(b) Great care in purchasing additions to the herd. Home breeding is the safest way of procuring additional stock.

(c) Good fences to protect the herd from contact with stray hogs.

(d) Avoidance of the various nostrums and alleged conditioning preparations.

(e) The feeding of well-balanced rations in sufficient quantity to maintain health and promote growth.

PRESIDENT WIGHT: Gentlemen, you have heard the report of the Committee on Communicable Diseases of Swine. What is your pleasure as to its disposition?

It was regularly moved, seconded and carried that the report be adopted.

PRESIDENT WIGHT: I wonder if it wouldn't be a good plan to devote ten minutes to a little discussion. I shall be glad to hear from anyone who has any thoughts on the subject that has just been presented.

DR. J. W. CONNAWAY: Those of you who have been attending here for many years know that this was a subject which aroused intense discussion, but it seems to have arrived at a point where there is no great interest in it. I don't want to start any of those old-time discussions, but I want to tell Dr. Atherton that he would have been happy, indeed, if he could have attended the International Veterinary Congress and heard the representative from the Irish Free State say that the principal cause of the spread of hog cholera

in Ireland was through these pork scraps, showing that the products of infected animals need much more attention, probably, than has been given.

That also recalls that at the Congress the matter of the sale of infected products of other kinds was an important problem in international commerce. A resolution was presented to make a much more stringent inspection of the products of live stock going into international trade, and particularly hides that might be infected with anthrax.

PRESIDENT WIGHT: Does anyone else wish to speak on the swine disease situation? If not, we will proceed with the next item, which is the report of the Committee on Parasitic Diseases, of which Dr. A. T. Kinsley is Chairman.

Dr. Kinsley read the report.

REPORT OF COMMITTEE ON PARASITIC DISEASES

DR. A. T. KINSLEY, *Chairman*, Kansas City, Mo.

Dr. H. A. Wilson, Jefferson City, Mo.

Dr. W. H. Lytle, Salem, Ore.

Dr. W. K. Lewis, Columbia, S. C.

Dr. Robert Pryor, Olympia, Wash.

Your Committee on Parasitic Diseases has questioned the advisability of presenting a report because there is little that can be added to the previous splendid annual reports that have been given by the preceding committees.

Progress has been made in the control of tick fever, scabies in cattle and sheep, and it has been demonstrated that it is possible to control bots of the horse by systematic medication, at the proper season of the year, with carbon disulphid. The value of the McLean County system for diminishing the ravages of round worms of swine is quite generally recognized and is being more extensively employed each year.

Some representatives of the Ostertagi group of parasites have been identified, in the central states. These parasites may be an important factor in the future.

During the past year Doctor Rees, of the Zoological Division of the B. A. I., has successfully transmitted *Anaplasma marginale* from infected to healthy susceptible animals by means of the brown dog tick (*Rhipicephalus sanguineus*). This one species of ticks has been incriminated as carrier of the causative factor of anaplasmosis. There may be other carrier parasites that will be identified in future investigations.

It is evident that the ultimate control of parasitism is dependent upon a knowledge of the life cycles of parasites and the availability of efficient parasitocides or other means of destroying the parasites or prohibiting the completion of their life cycles.

In the control of parasitism the following basic principles should not be overlooked:

1. Parasites are not as viable and resistant as their hosts.
2. To compensate for their relative weakness, parasites are endowed with extraordinary powers of reproduction.
3. Parasitocides are not only injurious to parasites but also to the host, hence there are limitations in their use.

Your Committee recommends continued research and investigation by all available agencies such as the B. A. I., experiment stations and veterinary practitioners.

There are attached memoranda by Drs. H. A. Wilson, W. H. Lytle and W. K. Lewis relative to the prevalence of parasites and the importance of parasitic diseases.

PREVALENCE OF PARASITIC CONDITIONS IN THE CENTRAL STATES

By H. A. WILSON, *Jefferson City, Mo.*
State Veterinarian

There is no way at present to estimate accurately the exact prevalence of parasites and parasitic conditions of live stock in Missouri and adjoining states, as insufficient research work has been done to arrive at an exact and accurate conclusion.

Judging from observations, personal experiences, and reports rendered by others, I am led to believe that parasites and parasitic diseases are of much graver importance to the Middle West than is commonly thought.

In the way of external parasites in meat-producing animals, scabies of cattle and sheep ranks first. Reports received from government inspectors at the killing-centers undoubtedly demonstrate that sheep scabies is very prevalent. In ninety-nine per cent of the cases we trace the infection back to some public market from which the sheep were purchased—sheep which were passed upon as being free from infestation at that particular time—which only goes to show that undoubtedly such sheep were exposed somewhere en route, as many of them have had their origin in states known to be free from sheep scab.

Reports of cattle scab are less frequent, but, nevertheless, occur with regularity.

As to internal parasites, I unhesitatingly make the statement that here in Missouri we have blocks of counties in which I would not expect to find a herd of cattle, sheep, or hogs, or a flock of chickens, entirely free from internal parasites, the type and variety of course depending upon the variety of animal inspected. Stomach worms of sheep are practically eliminating a lot of men from the sheep business. Round worms of hogs in some sections are perhaps the most serious drawback to the raising of hogs. Stomach worms of cattle are a handicap to many cattle-raisers; and it is not unusual to see a man who has lost most of his poultry flock, either directly or indirectly, as the result of intestinal or cecal worm infestation.

In view of the light of present knowledge, I am not afraid to make the statement that the prevalence of internal parasites of domestic animals, including poultry, is of such magnitude in the entire Middle West as to justify special investigation and special research work on the part of the federal government and state agencies.

PREVALENCE OF PARASITIC CONDITIONS IN THE PACIFIC NORTHWEST

By W. H. LYTLE, Salem, Oregon
State Veterinarian

The parasitic disease situation in the state of Oregon and the Pacific Northwest is similar to that of most other districts. We realize that there are always certain live stock parasitic diseases peculiar to certain sections of the country. Perhaps the parasitic disease that is of greatest concern to the sheep industry in the Pacific Northwest is the liver fluke. The parasitic infestation was doubtless introduced into this district through importations of sheep from England which occurred many years ago. The climatic conditions of the coast and Willamette Valley section of Oregon are such that liver fluke finds an inviting field here.

The particular snail or snails that act as intermediate hosts are found throughout the coastal section of the State in great numbers, hence, if infested sheep are introduced on the average western Oregon ranch, the always necessary and intermediate hosts are there in the form of snails to carry on the life cycle of the parasite. Since the use of carbon tetrachlorid as a treatment, the disease has come under better control. The use of copper sulphate as an immature snail destroyer seems to offer much encouragement towards the ultimate eradication of the parasitic infestation from the previously permanently infected pastures.

Lung worm in sheep and calves is quite prevalent. This parasitic disease appears to be on the increase. No highly satisfactory treatment or worm repellent has as yet been found. A ten per cent mixture of beechwood creosote and glycerin, using two- to four-cc doses, given intratracheally, has been found quite effective. We have not had satisfactory results through the use of injections of three cc or more of chloroform in the nostrils. Perhaps good feed is more effective than any other one thing, as it seems that the animal must develop a form of parasitic immunity before the malady may be overcome. No flock of sheep once infested appears to become free from the disease as

long as they are ranged on pastures that are subject to occasional rains or irrigation.

The round worm infestation found in sheep in many sections of the United States seems to be somewhat different here in the Pacific Northwest. We have a small intestinal round worm, so small that it is frequently overlooked, that is responsible for most of our intestinal round worm trouble in sheep. The tetrachlorethylene capsules seem to be quite effective against this round worm infestation. The parasite is identified as the *Ostertagi ostertagi*.

Tapeworm of sheep is quite common throughout the range district. Both the *Taenia fimbriata* and the *Taenia expansa* are found here. Unquestionably these parasites do a considerable amount of harm although it is quite difficult to find a yearling lamb in a ranch district that is not infested with the fringed tapeworm. These are found in the intestines and in the liver. No successful treatment seems to have been developed for the removal of the fringed tapeworm. For the most part, animals in the range district seem to harbor these tapeworms with impunity.

Nodular disease of sheep is not common here in the Northwest, but perhaps will be introduced as importations of sheep are being made from the middle states where it is quite common.

The sheep botfly is quite common and is causing additional trouble in sheep through the embryonal form seen as grub in the head. A similar parasitic disease is also quite common in deer and possibly causes some slight loss. The fly that lays the eggs that hatch and grow into the grub that infests the upper air-passage of the deer has not been identified, although it will be quite easy to do if one will gather some of the mature grubs, place them in soil that is enclosed in a screened box and allow the grub to develop into the fly.

We should perhaps mention that the lung worm is quite common in deer here in the Pacific Northwest and causes some considerable loss during severe winters.

Round worms of hogs are of course common as they are throughout the whole United States. Sanitation for round worm control is being carried out by some few farmers.

Parasitic diseases of cattle are confined mostly to lung worm and coccidiosis which is becoming increasingly common. Parasites of the horse are confined largely to the small round worms and the common horse bot. The external parasites of all animals are confined to body lice, the scab mites, and the ticks. The scab mites of sheep and cattle do not exist, as far as we know, in the state of Oregon. Scab or mange is quite common in hogs. The various species of body lice may be found on the animals of many farms. Ticks are confined to the common sheep ticks that are found on sheep and some of the wood ticks are found on all types of our domestic animals during the spring months.

PREVALENCE OF PARASITIC CONDITIONS IN THE SOUTHEASTERN STATES

By W. K. LEWIS, Columbia, South Carolina
State Veterinarian

The Southeastern states constitute a perfect hotbed for parasites and the losses are comparable to some of the contagious and infectious diseases. This is particularly true in swine and sheep. Very little is being done by any of the states for the control of parasitic infestation in a systematic manner, with the exception of the McLean County plan that is being advocated by the live stock sanitary officials of the various states.

Following is a list of parasites prevalent in the Southeastern states:

CATTLE

Haemonchus contortus (gastro-intestinal strongyli)
Oesophagostomum radiatum (nodular strongyli)

SHEEP

Haemonchus contortus (gastro-intestinal strongyli)
Oesophagostomum columbianum (nodular strongyli)

GOATS

Haemonchus contortus (gastro-intestinal strongyli)
Oesophagostomum columbianum (nodular strongyli)

HORSES AND MULES

Sclerostomiasis
Ascaris equi
Oxyuris equi
Gastrophilus intestinalis

SWINE

Ascaris lumbricoides (round)
Oesophagostomum sublatum (nodular)
Stephanurus dentatus (kidney)
Eichinorhynchus gigas (thornhead)

POULTRY

Heterakis perspicillum
Heterakis vesicularis
 Tapeworms (several species)
 Gizzard worms

DOGS

Belascaris marginata (round)
Ankylostoma canina (hook)
Filaria immitis
Taenia spp.

CATS

Belascaris mystax
Ankylostomum trigonacephalum
Taenia spp.

PRESIDENT WIGHT: You have heard the report of the Committee on Parasitic Diseases. What is your pleasure?

DR. CONNAWAY: I move its adoption.

The motion was regularly seconded, was put to a vote and carried.

* * * * *

Upon motion regularly made, seconded and carried, the session adjourned at 11:45 a. m.

THURSDAY AFTERNOON, DECEMBER 4, 1930

The fourth session convened at 1:40 p. m., President Wight presiding.

PRESIDENT WIGHT: Gentlemen, please come to order. I am going to call upon Dr. Nighbert to tell us something about parasites.

DR. J. D. NIGHBERT: After hearing Dr. Connaway's talk, just before the noon recess, and particularly his stress on sanitation, I became quite interested and I hope to make some remarks before the luncheon hour. So, through the kindness of our President, he has asked me to make such remarks as I had in mind at that time.

The veterinarian is in another position at this time. He is no longer dealing with individual animals or individual species of animals. He must know more than one thing. I can illustrate that best by telling the story of the mule-trader who walked up to a friend, an old negro mule-trader. He wanted to trade mules. They agreed to trade, but when they made the trade, one fellow charged that the mule was a balker and would not work. The other negro said, "He will work." He started him out in the field, and the mule stopped. "He is a worker, but there is a rabbit around here somewhere. He is good for rabbits."

They went to celebrate, to spend the fifty cents, and they had to cross the street. The mule stopped again. The fellow said, "I knew this mule was a balker."

"No, he ain't. He is just as good about fish hunting as he is about rabbits." That is the way with the veterinarian. He must know more than one thing, and he is knowing more than one thing, but it is taking time to get these things out.

I heard only the last few words of the report of Dr. Kinsley. 'Anyway, in whatever he said or any charges he made against parasites, I am like the Irishman, I agree with him, because that is one of the biggest factors confronting the live stock industry of the United States.

There has been no interstate regulation on the movement of live stock infected with internal parasites, but parasites are spreading very rapidly, as all of you know, who are making observations and have had experience. The swine kidney worm has been found in Connecticut; it has been found in ailing hogs in Indiana. Many other parasites are spreading, through our modern methods of transportation and through the unthoughtfulness on the part of people who take dogs and all sorts of animals into states that do not have restrictions.

The Committee for the past two or three years has not recommended any restrictions on the movement of live stock infested with internal parasites, owing to the nature of the situation, but all of us, who have had experience in making observations, agree that internal parasites are spreading.

Here is another point about parasites. We know of no benefit that will result from internal parasites. We know of only one parasite (maybe there are others) that has rendered a real service, an external parasite; certain forms of the fly larvae have been used in cleaning out deep puncture wounds in patients. Of course, we may have to change our mind about whether parasites are beneficial or not.

The kidney worm losses. For the first time in the history of this country, certain investigations have been made by your speaker in the southeastern states as to the actual loss resulting from two parasites, the swine kidney worm and the thornheaded worm. That investigation was undertaken by examining a week's kill of swine at Swift's plant at Macon, Georgia. It was found that on every animal killed there was a loss of about thirty cents. The total loss on about 5,600 hogs indicated a \$250 loss each day, and indicated an annual loss of \$80,000 at that one plant. Gentlemen, you can understand that is a great loss when you take the country from Texas to Virginia where this parasite abounds.

Through the sanitation project that we conducted in that section of the country, this kidney worm was greatly reduced. Where the herds were handled properly, our records show it was reduced 97 per cent in the kidney region and about 47 per cent in the liver. The liver is a valuable edible product. That is a big saving. That offers promise. That work is going on in the South. It interested not only the southern swine-producers but every swine-producer in the United States.

We might call attention to the fact that an important discovery concerning anaplasmosis has incriminated the brown dog tick. That tick is being spread throughout the country. Because of our transportation methods with automobiles, people take their dogs from the far North to the far South, from the far West to the far East. This tick is likely to spread. It will accommodate itself to new conditions and new environment. This is a very important discovery. There are probably other insect vectors that are transmitting this disease. As veterinarians and as sanitary officials, you know that anaplasmosis is a very important disease, one which is attracting considerable attention at this time.

The parasite factor enters into nearly every undertaking, through experimental feeding and testing and breeding. It has been brought to my attention this week and the last days of last week in attending organizations of research workers. The parasite factor is entering in at all times. We don't know what it does or how it does its work, or the pathology of it.

These men tell me that in their feeding and breeding experiments, this factor steps in and they see a big difference, a wave here, that they cannot account for. When they autopsy the animals they find certain species of parasites.

Gentlemen, these things, of course, are very interesting to me, and I am in a position now to carry this information throughout the country. I hope to meet veterinarians and encourage them, and do some educational work, because that is largely what it is.

In closing my remarks, this whole situation with reference to working together and getting information concerning these facts may be explained by this story. This question of working with others and recognizing their work may be cleared up with the story of the preacher who attempted to define the five points of religion.

He said, "You get religion when you don't want it; when you get it, you don't know it; if you know it, you haven't got it; when you get it, you can't lose it, but if you lose it, my brethren, you never had it." (Laughter and applause)

PRESIDENT WIGHT: Thank you, Dr. Nighbert.

The first paper on our program this afternoon is by Dr. L. Van Es, of the Department of Animal Pathology, University of Nebraska, entitled "Remarks on Avian Tuberculosis Infection in Mammals." (Applause)

Dr. Van Es read his paper.

REMARKS ON AVIAN TUBERCULOUS INFECTION IN MAMMALS

By L. VAN ES, *Lincoln Nebr.*

*Department of Animal Pathology and Hygiene, University of
Nebraska*

During the year now drawing to a close, the Nebraska Agricultural Experiment Station concluded a series of experiments pertaining to the avian infection source of mammalian tuberculosis.

This work was begun early in 1923 and its earlier phases were primarily undertaken, not with any definite purpose relating to avian tuberculosis, but in order to find, if at all possible, an explanation of the mounting morbidity rate of tuberculosis in swine as revealed by abattoir statistics.

Because certain definite results were obtained from the very beginning of these investigations, reports of progress were made, from time to time, to this and other organizations, so that whatever information became available could be utilized in the more practical work that is being carried on in the field. It was thought proper by your Committee on Tuberculosis that the final results of the experimental series also be submitted to you, even if they are already available in publication form.

As we learned quite early, it became apparent that the very form of tuberculous disease in swine, which gave rise to the increased retentions was, in the preponderating number of the cases, of avian origin. It became clear also that the great prevalence of avian tuberculosis could no longer be regarded as a mere poultry-yard problem. It was shown that it was respons-

ible for losses among mammalian live stock also and that this was such a constant phenomenon that there was ample justification for pursuing the problem further and to make an attempt to discover whether or not mammals other than swine also may be apt to become involved in tuberculosis primarily of avian origin.

The last phase of the Nebraska experiments had to do with the latter aspect of the problem. The experiments, as well as their results, are described in Nebraska Agricultural Experiment Station Research Bulletin No. 49, recently off the press.

The work therein reported was principally undertaken in order to find if avian infection could or does have importance as a cause of bovine tuberculosis and, above all, in order to discover if the great mass of tubercle bacilli of avian strain distributed promiscuously over the farmsteads of a large section of the country could be regarded as a menace to the health of the people on farms or to that of the ultimate consumers of poultry products.

Cases of human tuberculosis, apparently due to an avian infection source, had been reported by European observers and in this country some sensational statements pertaining to the subject had found their way to the newspaper pages.

In the typing technic pursued, the animal inoculations so frequently described at these meetings were entirely depended on and in order to have an additional guide in interpretations and for some other reasons, the material examined was made to include that collected from cases of tuberculous infection which gave most promise of being caused by the homologous bacillary strains.

In some series of the tuberculous material collected, the number of cases involved was so small that the results could not well be made the basis for any conclusions. In the larger groups the results, with a greater degree of probability, reflect the actual status of the host-parasite relations in tuberculous infection. We hereby point out the groups in which significant results were obtained.

AVIAN STRAIN PREDOMINATES IN DOMESTIC BIRDS

Material from 105 domestic birds, which could be successfully typed, yielded a purely avian strain of *B. tuberculosis* in 104 of the cases. In the remaining case the avian bacillus was accompanied by a bacillus of mammalian origin. With only a few exceptions this material came from farms rather widely dis-

tributed over the State and hence should represent what actually may be found in the tuberculosis of domesticated birds.

The oft-asked question whether or not birds may acquire tuberculosis due to bacilli of mammalian origin must apparently be answered in the negative, in spite of the fact that occasionally a fowl may develop a small, non-progressive lesion in the liver or spleen after an intravenous inoculation.

The typing of bacilli present in bovine cases of generalized tuberculosis was deemed advisable as a means of controlling the interpretation of certain results obtained in other series. The material taken from 58 cases of generalized tuberculosis in cattle originating in various parts of the United States was subjected to typing experiments and all yielded bacilli of the bovine type.

Entirely negative results were obtained with 39 separate consignments of hemorrhagic lymph-nodes found in so-called "no-lesion" reactors to the tuberculin test and with five pregnant uteri taken from bovines which also had reacted positively.

Forty different sets of tuberculous lesions of the bovine skin and subcutis were subjected to examination and typing experiments. The microscopic examination revealed acid-fast bacilli in all of the forty consignments of lesions but four.

All the typing experiments undertaken with this series of material yielded negative results; apparently no living tubercle bacilli were present.

BOVINE SKIN LESIONS FAIL TO INFECT HOGS

In another attempt to throw light on the possible origin or nature of the acid-fast organisms, some tuberculosis-free pigs were fed a considerable amount of bovine skin lesions. Some months after feeding, the pigs were subjected to tests with avian and mammalian tuberculins. They did not react to either and no tuberculous lesions could be found at autopsy.

In another series of bovine material, isolated lesions only were included and these principally pertained to solitary lymph-nodes. In all, analyzable results were obtained with the material taken from 115 cases. Of these, 100 yielded bacilli of mammalian strains, 11 of the avian type, while in 4 both mammalian and avian bacillary types were present. Thus, in slightly more than 12 per cent, avian bacilli were found to be present.

The human lesions examined in the Nebraska experiments originated, for the greater part, from cases of tuberculosis of

extra-pulmonary localization. It was possible to obtain typing results with material taken from 227 cases. Eight of these pertained to generalized tuberculosis, 44 to bone and joint disease, 99 to tuberculosis of the kidney, 25 to tuberculous lymphadenitis, 13 to spinal fluid containing tubercle bacilli, 11 to abscesses and 27 to miscellaneous localization of tuberculous infection.

The typing set-up in this series included rabbits, in order to supplement any evidence of avian infection which might come to light in the course of the work. It also made possible the determination of the extent of bovine tubercle bacilli in the lesions used for typing.

The final results with the material derived from the 227 cases of human tuberculosis, largely non-pulmonary, revealed that in 217 of them the human bacillary strain was identified in the lesions; in 9 cases the bovine tubercle bacillus was present; in one case a mammalian strain was revealed (premature death of the typing rabbits) and in none of the lesions examined was the presence of avian bacillary infection even suggested by the typing evidence obtained.

It is evident from the Nebraska typing results that avian sources of tuberculosis play an important part in the etiology of the disease in swine and that in a certain type of tuberculous disease in cattle, the avian bacillary strain is also a causative factor in a conspicuous number of the cases examined.

While in comparison with bacilli of mammalian origin, the avian tubercle bacillus causes, as a rule, benign lesions in the mammals affected, this fact should not be permitted to detract from the importance of the phenomenon. All heterologous tuberculous infection must be accepted as being endowed with potentialities which are apt to change it to a homologous one in the course of time. In fact, we have already found avian bacilli in etiologic relation with generalized tuberculosis of swine and similar observations are recorded in literature.

IMPORTANCE OF AVIAN INFECTION IN CATTLE

To what extent avian tuberculous infection of cattle may become a disturbing factor in the interpretation of tuberculin-test results can be ascertained only by experimental inquiry especially designed for the purpose. That among the eleven cases of avian infection which the Nebraska experiments revealed in cattle, at least six pertained to animals reacting to the regular tuberculin test and which were sent to slaughter for that reason may be a

mere incident. The observation, however, should have some weight when the importance of avian tuberculous infection in cattle is to be estimated.

For so far as the problem of avian tuberculosis is viewed from a live stock sanitary point of view, there can be no doubt about the justification and the need for its suppression and eradication. That such measures are less urgent for the preservation of the public health is indicated by the typing results obtained in the series in which human lesions were examined. In as much as cases of avian infection have occurred in some of the European countries, it would be folly to declare dogmatically that avian infection sources are entirely to be disregarded. The hazard, at least in this country, is apparently a very slight one.

As the Nebraska experiments were essentially designed to throw light on the part played by tuberculous infection of avian origin in mammals, the observations concerning the incidence of bovine tuberculosis must be looked upon as a by-product of the project.

In as much as the series in which human lesions were typed was one in which it was deemed wise to reinforce the typing set-up with rabbits, the information relative to the part played by the bovine bacillary strain became automatically available.

BOVINE INFECTION IN EXTRAPULMONARY TUBERCULOSIS

It was found that in nine of the 227 selected cases of extrapulmonary tuberculosis the bovine tubercle bacillus could be definitely demonstrated. Thus, in a type of lesions in which a maximum rate of bovine bacillary infection might be expected, less than 4 per cent were found to be thus involved.

The relatively low incidence of bovine infection in a representative group of cases may indicate a rather favorable situation with reference to the infection sources operating in the area from which the preponderating part of the typing material was drawn.

The incidence of bovine infection among humans prevailing in the area mentioned during a previous decade is not accurately known and cannot be adequately estimated at this time. Hence it is impossible to attribute the relatively low incidence of bovine infection disclosed in the Nebraska investigations to a decline of the morbidity of cattle disease or to some other factor.

There is, however, an indication, perhaps merely a faint one, that we are actually confronted with a reduced incidence of bovine

tuberculosis in man. A close examination of the Nebraska data reveals the interesting fact that the greater number of cases from which the material disclosed the bovine bacillary type originated from adults and not from the individuals belonging to the age group which, in all surveys previously and elsewhere made, showed the highest incidence of bovine tuberculosis.

Data regarding the ages of the persons supplying the typing material could not be obtained in all cases, but it was possible to estimate, with a fair degree of accuracy, that about 40 per cent of the lesion consignments pertained to individuals within the age groups of 0-15 years. Only two of the nine cases of tuberculosis shown to be of bovine origin were furnished by this group.

No evidence of bovine infection was observed in material derived from 31 tuberculous children less than ten years old, whose ages were accurately known. In all of these the human bacillary strain was found to be present in the lesions.

Another interesting observation has to do with the localization of lesions due to bovine infection. Owing to an opinion expressed by the Viennese clinician Löwenstein, that the kidney is one of the optimum sites of the avian tubercle bacillus when it invades the human body, a special effort was made to secure as much renal material as possible. This accounts for the fact that material from not less than 99 cases of renal tuberculosis could be typed. This material yielded not less than 6 of the 9 cases of bovine infection encountered in the entire series.

From this rather scant amount of evidence we may be tempted to conclude, with some show of justification, that the preponderating number of cases of bovine infection in adults and the marked freedom of this form of tuberculous disease shown by children indicates that the latter are no longer conspicuously exposed to bovine infection sources and that the adults concerned were probably affected with tuberculosis of bovine origin acquired during the more susceptible age periods, when infection hazards were greater than they are at the present.

Apparently the kidney is the organ where bovine infection is most apt to maintain itself.

Many years ago it was predicted by those who had intimate knowledge of tuberculosis and its ways, that the elimination of the tuberculous dairy herd and the sanitary supervision of the milk supply would, in time, remove the hazard of tuberculous infection in children caused by the bovine bacillary type. The facts revealed by the Nebraska experiments, few as they are,

may serve as evidence that the prediction was warranted and that a promise is being redeemed.

The typing experiments showed further that in human tuberculosis, even in its extra-pulmonary forms, the human bacillary strain is the most prolific cause of harm and that in the suppression of the disease in man, human infection sources must continue to receive the most careful attention.

DISCUSSION

PRESIDENT WIGHT: Dr. Van Es's paper is to be discussed by Dr. E. L. Stubbs, of the University of Pennsylvania.

DR. E. L. STUBBS: Mr. President and Gentlemen: Dr. Van Es, from his great wealth of knowledge in tuberculosis and his great experience in that disease, has covered the subject of the distribution of avian tuberculosis among mammals in a very thorough manner.

It has generally been considered that the avian type of organism is less virulent and less capable of producing tuberculosis than either the human or bovine type. On the other hand, the avian organism is easier to isolate; it will grow at a wider range of temperature, that is, at a higher or lower temperature than either of the two mammalian types. It is also less particular about its culture media; it is less selective. It grows more rapidly and has the ability of growing beneath the surface of liquid culture media as well as on the surface of such media, an ability which the other two types do not have.

Thus, we might expect to find the avian type of organism more viable in a greater variety of places than is true of the two mammalian types.

Dr. Van Es has pointed out, on many occasions, the fact that the lesions of avian tuberculosis contain large numbers of organisms, that the body of the fowl furnishes a very suitable habitat for those organisms. In other words, he has stated that it seems to act as a good incubator for the avian type of organism.

Thus we consider that the avian type is more prolific than the two other types, and we might expect, under natural conditions, to find it in a greater variety of places. So we must keep on the watch for this organism in many different animals.

It was a long time before it was recognized that avian tuberculosis was present in swine, among which it has caused so much concern. It has been known for a long time that it infects horses. While this animal is not very susceptible to tuberculosis, fortunately very little damage has been done.

Dr. Feldman showed us last year that in the dog, which is not very susceptible to tuberculosis, if the avian type of organism be introduced into the brain, it produces lesions of tuberculosis not only in the brain but in remote parts of the body. He also showed us that the avian organism, even after passing through the intestinal tract of the dog, was still virulent and capable of producing avian tuberculosis in susceptible animals.

If this be true in the dog, which is not considered very susceptible, we might expect it to be true in a great variety of animals.

Dr. Schalk has shown us that the avian tubercle bacillus will remain alive in the soil for a long period of time and still be capable of producing tuberculosis. He also has shown us that rats and mice will spread avian tuberculosis among chickens and perhaps among other animals.

This past summer I visited the laboratory of Dr. Plum, in Denmark. Dr. Plum, as you know, has reported several cases of abortion in cattle which he attributed to the avian tubercle bacillus. They are still finding such cases in Denmark.

Dr. Van Es has pointed out that the avian organism may adapt itself to the bovine host and may produce lesions of tuberculosis in such a host. While these lesions are benign and non-progressive, we often wonder when a change may occur and when our cattle become more susceptible to this disease.

He also stated that tuberculosis of the avian type occurs with enough frequency in cattle at least to warrant a very careful investigation further along this line.

Therefore, the more and more that researches are made, the probability is that the greater the variety of places and animals we will find harboring the avian type of organism. (Applause)

PRESIDENT WIGHT: The second gentleman who was to discuss this paper, unfortunately is not with us. Dr. Schalk is ill at home, for which we are all very sorry. He is a man who has contributed much to these programs, and we miss him. We hope for his speedy recovery.

At this time I will be glad to call Dr. Connaway to the chair, and I will present this brief résumé of the work last year. (Applause)

First Vice-President Connaway took the chair and President Wight read his paper entitled, "Present Status of National Coöperative Tuberculosis Eradication Campaign in the United States." . . . (Applause)

PRESENT STATUS OF COOPERATIVE TUBERCULOSIS ERADICATION CAMPAIGN IN THE UNITED STATES

By A. E. WIGHT, Washington, D. C.

*Chief, Tuberculosis Eradication Division, U. S. Bureau of
Animal Industry*

It is gratifying to be able to report on this occasion that the coöperative campaign to eliminate tuberculosis from live stock has progressed in a most favorable manner during the past twelve months. The live stock owners and the many workers engaged in this activity have been greatly inspired by the excellent results that have accrued as a result of the great efforts put forth by all concerned to make this work successful. More substantial progress has been made during the last twelve months than during any similar period. This organization is, of course, greatly interested in the various phases of the campaign that have taken place during the last year, and you gentlemen who have contributed so much toward its success will, I am sure, feel justified in devoting time to the discussion of this subject here today.

There are many occurrences which bring to our attention almost daily the importance of pursuing the work of eradicating tuberculosis in live stock in the most efficient manner. The people of this country have a tremendous investment involved in this activity, and it must be properly safeguarded.

PREVALENCE OF BOVINE TUBERCULOSIS

In May of this year, the fifth biennial survey was made by the state and federal authorities in charge of this work in each state to learn the approximate extent to which bovine tubercu-

losis existed. It is encouraging to report that the results of this survey indicate a further reduction in the percentage of bovine tuberculosis.

When the first survey was made in May, 1922, it was estimated that 4.0 per cent of all the cattle in the United States were tuberculous. This was reduced to 2.0 per cent in May, 1928, and in May, 1930, it was reduced to 1.7 per cent. Out of a total of 3,072 counties in the United States, tuberculosis among cattle was reported to exist to more than 7.0 per cent in only 121 counties. In a little more than 1,400 counties, however, the disease exists to not more than 1.0 per cent. Many of the counties in the latter group are in the modified accredited area. The workers in this campaign have found these biennial surveys to be of much interest, as well as helpful in planning future operations.

ACCREDITED-HERD WORK

While there has been a slight reduction in the number of fully accredited herds in the various states during the past year, this is accounted for largely by the fact that many of the fully accredited herds were located in counties where area work was taken up. It has been the policy in some states not to continue the maintaining of fully accredited herds to such a great extent as heretofore.

During the last year the usual observations were made as to the number of accredited herds of cattle in which reactors were found upon the annual retest. The results of this study show that out of approximately 80,000 herds, reactors were found in only 2,674, or 3.3 per cent. About 78 per cent of these infected herds were located in counties that were not in the modified accredited area.

In a great majority of the cases where reactors were found the number was limited to one or two, which were slight cases, indicating that tuberculosis existed to but a very limited degree in these accredited herds. The accredited-herd plan, which was made the cornerstone of this campaign by the United States Live Stock Sanitary Association, has served and is still serving a highly valuable purpose.

A feature of more than ordinary interest in connection with the retesting of fully accredited herds is a new plan adopted by the State of New York. Under the provisions of a new law in that state, the accredited herds of cattle are retested annually

at the expense of the State, the work, however, being done by the local practicing accredited veterinarians.

AREA WORK

So much is being accomplished in connection with the area work feature of this campaign that it is practically impossible to give it justice in connection with a discussion of this nature. During the last twelve months, 228 counties have been added to the list of those that are modified accredited areas, and in which the degree of bovine tuberculosis has been found to exist to not more than one-half of one per cent upon the application of the tuberculin test. In these 228 counties, approximately 4,160,000 cattle were tuberculin-tested, indicating the enormous amount of work that was necessary to accomplish the desired results. The average degree of infection of tuberculosis reported when these 228 counties were recommended for modification was 0.43 per cent.

On August 1, 1930, the last county in the state of Michigan was declared a modified accredited area, making that state the third in which all counties had been declared modified accredited areas.

Another feature in connection with the tuberculin-testing of cattle in area work is the retesting of the cattle in the modified accredited areas to comply with the provisions of the area plan. During the last twelve months, 2,502,386 cattle, located in 185 counties that were due for remodification, were tuberculin-tested, from which 8,469 reactors, or approximately 0.34 per cent, were removed. This resulted in the remodification of these 185 counties. In no county was the degree of infection found to be high enough to cause it to be removed from the modified list. This record is one that can be deemed satisfactory, but it does show that some infection will appear in modified accredited areas, making it imperative that the necessary retesting be given attention at the proper time.

There are at this time 1,055 counties, located in 36 states, in the modified accredited area, or approximately 34 per cent of the total number of counties in the United States. The work is now in progress in many other counties with a view of completion as soon as possible. Area work was taken up during the last year in some states for the first time, with very gratifying results. The area plan, unquestionably, is applicable to all sections of this country. It is popular with the live stock owners, and is a practicable way to eliminate bovine tuberculosis.

CATTLE TUBERCULIN-TESTED FOR INTERSTATE SHIPMENT

There has been some reduction in the volume of business in connection with cattle that are subject to the tuberculin test when moved interstate. Approximately 120,000 fewer cattle were tested for interstate shipment during the fiscal year ended June 30, 1930, than during the previous fiscal year. The reason for this is probably the fact that there was a falling-off in the demand for dairy cattle in certain states, and also, that it is now possible, in some states, for the farmers to obtain their replacements within their own states. The degree of infection of tuberculosis found in cattle tested for interstate shipment remained the same as that during the previous year, namely, 0.4 per cent.

APPRAISAL, INDEMNITY AND SALVAGE

The amount of salvage received by the owners of cattle that have been condemned on account of being affected with tuberculosis is, of course, dependent upon market conditions. During the last few months there has been quite a reduction in the amount received by the owner as salvage. In September, 1929, the average salvage in the United States for condemned tuberculous cattle was approximately \$46.00, whereas, in September, 1930, it was about \$26.00, or \$20.00 less. The average appraisal of condemned tuberculous cattle in September, 1930, was about \$30.00 less than it was a year ago, indicating that there has been a decrease in the value of dairy cattle during the last year. The average amount paid the owners of tuberculous cattle by the states is slightly less than it was a year ago, while the average federal payment is about \$2.00 in excess of what it was one year ago.

TUBERCULOSIS FOUND IN CATTLE AND SWINE AT SLAUGHTERING CENTERS

The decrease in the percentage of tuberculosis found at the various packing centers has continued. Last year the retentions of hogs found to be tuberculous were 11.4 per cent. It will be recalled that in 1924, or six years ago, the average of such retentions was 15.2 per cent. There has also been a decrease in the number of hogs found to be affected with tuberculosis in the advanced stages.

In cattle slaughtered at establishments under federal inspection, exclusive of known reactors, there has also been a reduction

in the numbers retained and condemned because of tuberculosis. During the fiscal year ended June 30, 1930, out of more than 8,000,000 cattle examined by federal veterinarians, only 0.73 per cent were found to show evidence of tuberculosis. There has been a very marked reduction in the percentage of cattle found to be affected with generalized tuberculosis as compared with a few years ago. This feature alone is one that can be looked upon as a very concrete example of the economic benefits to be derived from tuberculosis eradication. It is estimated that an annual saving of approximately \$3,500,000 results from the much smaller number of cattle and hogs now condemned on account of tuberculosis.

Another feature that is sometimes overlooked is the fact that tuberculosis, found among cattle and swine on postmortem examination, was increasing up to the time the tuberculosis-eradication campaign became noticeably effective, indicating that if the disease had not been checked there would, by this time, have been a much higher degree of infection, resulting in an economic loss of great magnitude.

PARATUBERCULOSIS

Paratuberculosis, or Johne's disease, has been reported from fifteen different states. However, the disease was not found to be widespread and, apparently, is not gaining much headway. Since the plan of taking up the control and eradication of this disease was inaugurated, a little more than three years ago, about 400 cattle affected with the disease have been condemned. Diagnosis of the disease in the living animal has been made, in most cases, by the use of johnin. However, in a few instances avian tuberculin has been employed. The reports received from the representatives of the Bureau of Animal Industry in charge of this work in the field indicate that the results obtained by the application of either one of these diagnostic agents are not entirely satisfactory. It is hoped that more research work will be conducted in order to bring about an improvement in the methods of diagnosing paratuberculosis in cattle.

AVIAN TUBERCULOSIS

During the last year the veterinarians engaged in tuberculosis-eradication work among cattle and swine in many of the states gave attention also to the problem of tuberculosis in poultry. Poultry-raisers likewise have displayed much interest in this

subject. Avian tuberculosis appears to be confined largely to the middle western and north central states. In this territory the state officials and others interested in the problem are giving the matter considerable attention with the view of developing a practicable plan of eliminating the disease. The good results thus far obtained seem fully to justify the expenditure of more funds in controlling this disease. More concentrated effort should be applied, especially in the more seriously infected localities.

GENERAL STATEMENTS

The campaign to eradicate tuberculosis among live stock, including poultry, has been aided materially during the year by the press. Daily papers and other publications have kept the public informed as to what is taking place in this work. The public has also received much information on the campaign through the radio.

A report containing the addresses made at the Midwestern States Tuberculosis Conference, held at Cedar Rapids, Iowa, in April, 1930, which has been made available through the efforts of Prof. H. R. Smith, of Chicago, is a valuable contribution in this connection. The same applies to the report of the Eastern States Tuberculosis Conference, held at Albany, N. Y., last June, for which Dr. E. T. Faulder, Director, New York State Bureau of Animal Industry, is responsible. A report of especial interest was issued by the Sanitary Committee of the National Livestock Exchange in Chicago, Ill., a little less than one year ago.

Another important contribution to the literature on the subject of eradicating animal tuberculosis is the recent revision and amplification of Miscellaneous Publication No. 59, "Reliability of the Tuberculin Test," of the United States Department of Agriculture, by Dr. John R. Mohler, Chief of the Bureau of Animal Industry.

The favorable termination of the litigation long pending in Iowa in connection with the famous Mitchell County case has been a source of much satisfaction to those who have the interest of this campaign at heart.

The sweeping decision rendered by the Supreme Court of Iowa in this case should have a most helpful effect on the future work of tuberculosis eradication among live stock in all sections of the United States. The court cases that developed in Michigan,

Ohio, Nebraska, and other sections, in connection with the tuberculosis-eradication campaign, all of which resulted most favorably for the states concerned, will be a source of benefit to all future work in the eradication of any contagious disease of live stock.

On September 19, 1930, there was held at Lansing, Mich., an Achievement Conference, which was the first of its kind ever held. The occasion for this was the fact that all of the counties in the state of Michigan had been placed in the modified accredited area, meaning that bovine tuberculosis had been practically eliminated from that State. This well-attended conference developed the fact that meetings of this kind are appreciated and warranted.

During the next few months the legislatures of practically all of the states will be in session. The question of additional funds to carry on tuberculosis eradication work among live stock will be one of considerable importance in all of the states, but will be of much greater importance in a number of states. At this time, when so much has already been accomplished, it is extremely essential that there be no interruption to the progress of the work. Its completion will require several years in some of the more heavily infected states, but, with the determination that exists among the interested people in these localities, a successful ending may be confidently expected.

In the territory where the disease exists to but a slight extent, such as in the great intermountain section, active steps should be taken to place more counties in the modified accredited area. This, I am sure, can be done. It was my privilege during the past summer to visit that section, which gave me an opportunity again to observe the conditions relative to the incidence and the control of bovine tuberculosis there. I believe that the live stock owners of that section are ready, and will take up the work, especially when they are informed of the probability that there will be some restrictions against the movement of their cattle into the Middle West for feeding purposes, unless such cattle originate in modified accredited areas.

CONCLUSION

In presenting this report on the progress and developments in connection with the elimination of animal tuberculosis, to which you have so earnestly listened, it has been necessary to mention some statistics, but in order that you may have a more complete

statistical report of some of the more important features of the campaign, there has been prepared by the United States Department of Agriculture, for distribution at this meeting, a pamphlet containing a number of tables showing the status of this work up to November 1. Additional copies may be obtained by addressing the Bureau of Animal Industry at Washington, D. C.

I thank you for your most kind attention.

President Wight resumed the chair.

PRESIDENT WIGHT: The next paper will be by Dr. J. A. Myers, President of the Minnesota Public Health Association and Associate Professor of Preventive Medicine, University of Minnesota, Minneapolis, Minnesota. (Applause)

Dr. Myers then delivered his address, "Newer Aspects of the Prevention of Tuberculosis"

NEWER ASPECTS OF THE PREVENTION OF TUBERCULOSIS

By J. ARTHUR MYERS, Minneapolis, Minn.

Associate Professor of Preventive Medicine, University of Minnesota

The geographical distribution of tuberculosis in the human family and among domestic animals is intensely interesting. Just where the germ of tuberculosis originated no one knows. There is a harmless germ that has the same appearance under the microscope as the germ of tuberculosis which is prevalent among the grasses, particularly timothy. Some workers are of the opinion that this was the original germ and that it was taken into the bodies of animals feeding upon and coming in contact with the grasses where it adapted itself so that it was able to live and flourish in the animal body and produce disease. These workers believe that such germs in the bodies of cattle over long periods of time flourished under their new environment better than anywhere else. Hence we call them the bovine type of tuberculosis germs. Others becoming accustomed to living in the bodies of birds became known as the avian type, and still others entering the bodies of human beings were known as the human type. A still lower form, which has not been known to produce disease, is found in the bodies of such animals as reptiles, amphibians and fishes, and may be spoken of as the acid-fast bacillus of cold-blooded animals.

Just where the germs of tuberculosis made their first appearance on the earth no one knows. We do know that with the dawn of history tuberculosis seemed to be present in the human

body. On the old Babylonian tablets were found references to this disease. In the Egyptian mummies whose bodies are believed to have lived 3,000 to 5,000 years ago, there is definite evidence of tuberculous disease. In many Greek manuscripts there are clear descriptions of people suffering from consumption or phthisis, but none of these evidences give us much idea of the beginning of the disease. However, in comparatively recent times the disease has been known to spread to parts of the world where previously it did not exist. These facts are accurately recorded in history. Some examples are America, Africa and the South Sea Islands. Among the American Indians tuberculosis did not exist before the days of colonization. In Africa not until the conquerors and traders entered the country did tuberculosis exist among the natives. The disease was unknown to the tribes of the South Sea Islands until man, with his so-called civilization, carried it to them.

From the fact that the disease was not found in such places certain deductions were drawn. The fact that the American Indian did not have tuberculosis was attributed to his out-of-door life. Others said that certain parts of the world were immune to this disease since the natives of these parts had never developed it, and consequently that anyone who had the disease would be cured very quickly in these areas. No less a person than Brehmer, of Germany, one of the pioneers in tuberculosis in the nineteenth century, was an advocate of this belief. Among the South Sea Islands the germ of tuberculosis was spread through patients seeking spots on the earth that were immune from tuberculosis, for when civilized tuberculous men and women reached the Islands the germs of tuberculosis spread to the natives, often decimating them. Robert Louis Stevenson went to these Islands for his health.

TUBERCULOSIS INTRODUCED INTO AFRICA

The natives of Africa were free from tuberculosis, but the traders and conquerors carried the germs to them. First, it became prevalent among the natives along the coast, but as time passed civilized man penetrated deeper and deeper into the interior of Africa, and following in his wake came tuberculosis among the natives, until today there are few spots in that continent where tuberculosis is unknown among the natives. The American Indian enjoyed good health as far as tuberculosis was concerned. It did not exist among his tribes, but the colonists

and their civilization brought tuberculosis to him. His out-of-door existence then proved worthless as an immunity factor. He had previously lacked the cause of the disease, but, with the cause present, the germs of tuberculosis, such large numbers of his race developed the disease that today tuberculosis among the American Indian is one of the great strongholds of the disease.

That one of the great strongholds is among the Negro race in both Africa and America, no one doubts. Moreover, no one doubts that the Indian is another stronghold of tuberculosis. Perhaps this is true, not because the Indian and the Negro have any less resistance to tuberculosis than people of other races, but because of their mode of living that the disease spreads among them rapidly. The problem of eradicating the disease from their races becomes an extremely difficult one. When one of their members develops tuberculosis, because of the intimate contact with so many others, the infection spreads rapidly. To find from ten to twenty-five or more of these people living together in two or three small rooms is not uncommon.

Tuberculosis sought a citadel among the domestic animals, and man in his civilization aided tremendously in its development. For example, the disease did not exist among the cattle of the great western plains of the United States, nor among the cattle of South America, but in his ignorance man imported it. He sought to improve stock, and as he imported animals for this purpose he imported in their bodies the germs of tuberculosis, which quickly spread to the bodies of their animal associates.

NATURAL BARRIERS HINDERED SPREAD

Certain natural barriers, such as rivers, mountains and the seas, prevented the spread of tubercle bacilli in so far as they made communication difficult. By means of improved transportation, civilized man overcame these barriers and carried the tubercle bacilli as unknown and unsuspected companions with him.

After man had spread tuberculosis to the uttermost parts of the earth, he became enlightened and set to work to drive the disease from its strongholds. He is entirely responsible for some of the worst of these fortresses. The enlightenment came through the discovering of certain facts and these in comparatively recent times. Klenke, Villemin, Cohnheim and others proved that there is something which man expectorates from a tuberculous lung that produces the disease in animals when this material

is introduced into their bodies. The conclusion was that if the disease is transmissible from man to animals it is also transmissible from person to person.

But what was the "something" that made the disease contagious? The interest of a country practitioner in Germany had been stimulated. He labored incessantly over a long period of time and was rewarded by visualizing the "something" that caused the disease. It was a very small germ that could be seen only through the microscope, and Koch proved beyond doubt that it was the cause of tuberculosis. This contribution shattered the theory that the disease is inherited. No subsequent study has shown that the disease is ever inherited, although it is sometimes congenital, since it is transmitted from person to person or from animal to animal, or from animal to person, through direct or indirect contact exposure. The establishment of this fact has lent tremendous encouragement to the workers in the field of tuberculosis.

The pessimism expressed by the Greeks to the effect that consumption is a universal disease and inherited, in other words, that it passes from generation to generation through inheritance and nothing can be done to control it, was no longer warranted. With the abandonment of such beliefs and the substitution of facts, one can see how the vision of driving tuberculosis from its strongholds may eventually be realized. Man has learned also that the germs of tuberculosis do not grow in nature except in the bodies of people, and some of the warm-blooded animals. At one time we believed that when the germs of tuberculosis were coughed from tuberculous lungs and were expectorated upon the ground, floors and elsewhere, they continued to multiply. True, they sometimes remain alive and capable of producing disease over days, weeks and months, but the fact that they do not multiply lends encouragement to those attempting to drive the disease from its forts.

BONE AND JOINT LESIONS CAUSED BY BOVINE TYPE

One of the first strongholds to be attacked was that of the disease among animals, particularly cattle. The tuberculosis germs of cattle are capable of producing disease in the human body. This is particularly true in the earlier ages of life. Most of the bone and joint tuberculosis, as well as tuberculosis of the lymph-nodes, often resulting in swellings along the sides of the neck, was due to this bovine type of tuberculosis germ. No one

could ask for better proof than the reduced incidence of these forms of tuberculosis in infancy and childhood which has occurred after pasteurizing ordinances became effective in large cities. Tuberculosis of the bones and joints is very deforming in many instances. The spine is the most frequent part of the body framework to be attacked. The deformity frequently results in hunchback, which is a terrible handicap to the individual. Second and third to the spine, the bones of the hip and knee joints are attacked most frequently. The disease in these joints very often results in complete locking, thus crippling and handicapping the individual for life. After this bovine type of tuberculosis germ was proved the causative agent of these forms of tuberculosis, an attack was made upon the stronghold of this type of germ; namely, among the cattle.

Pasteurization ordinances have helped tremendously, but unfortunately pasteurization is not practiced everywhere, and there are many people who still do not believe in it. Therefore, a procedure that has proved of great value is that undertaken by the veterinarians and their associates of this and other countries to eradicate tuberculosis from cattle. The veterinarians early learned to go among the animal herds and apply the tuberculin test to determine which animals had been infected with tubercle bacilli.

EARLY USE OF TUBERCULIN FOR DIAGNOSIS

Indeed, the veterinarians first applied the tuberculin test in a practical way. It is true that Koch used tuberculin as a test for tuberculosis in guinea pigs in 1890, but in 1891, a veterinarian by the name of Gutman, of the University of Dorpat, Russia, used this test to detect tuberculous infection among cattle. In December of the same year, Dr. Leonard Pearson, Professor of Veterinary Medicine, University of Pennsylvania, brought to America tuberculin which he had obtained from Gutman. In March of 1892, a committee from the University of Pennsylvania reported the result of the use of tuberculin as a diagnostic agent in cattle. Since that time the veterinarians have been hard at work reducing tuberculosis in the bodies of domestic animals.

I only wish that words could express the great appreciation that the medical profession has of the remarkable accomplishments of the veterinarians and closely allied groups. From an economic standpoint the saving to this country has been so great that most of us can not even conceive of the figures. Not only the veter-

inarians' desire to free the animal herds of tuberculosis spurs them on, but also the protection of the entire human family from tuberculosis. Every time we see a man or a woman with a hunchback deformity, we should stop and pay tribute to the veterinarian, knowing that the possibilities for such deformities among the girls and boys of the present and the future have been greatly reduced by this group of professional workers.

Where the proper coöperation has been afforded the veterinarians, they have reduced the incidence of tuberculous infection among cattle tremendously. How encouraging it is to hear a tireless laborer in this field like Dr. Charles E. Cotton state that through persistent effort it has been possible to reduce the incidence of tuberculous infection among cattle from approximately nine per cent to about .28 of one per cent in forty-eight counties of the state of Minnesota. In other words, where this work has been carried out we have reached the time in these counties when one must examine more than three hundred cattle to find one positive reactor. What is true of the work of this man and his associates, I am told is true of others throughout the country.

EFFECT OF TUBERCULOSIS ERADICATION CAMPAIGN ON HUMAN DISEASE

What effect has this great campaign against tuberculosis among the animal herds already had upon tuberculosis in the human family and what can we expect of it as it attains still greater success? In the Medical School and the School of Nursing of the University of Minnesota, as in many such schools in other states, we now see so few cases of tuberculosis of the cervical lymph-nodes and tuberculosis of the bones and joints that we do not always have enough clinical material of this kind to teach the medical students what we feel they should really know about this subject before they enter the professions of medicine and nursing. I am not lamenting this fact. It is most encouraging. When we do see such cases, frequently they are from small towns and rural communities, where no pasteurization ordinance exists, and where the people have failed to render the milk safe for human consumption by heat or where the veterinarians through lack of funds or coöperation have been unable to carry on their work. But, what is necessary for the future? Most certainly we need more health education among the people. They must be taught about the importance of keeping their animals free from disease,

and this can often be done best, I am sorry to say, by stressing the economic side. Incidentally they can be taught about the diseases of animals that are transmissible to man. When enough health education has been provided we should expect better coöperation. In fact, such good coöperation that the services of the veterinarians will be sought everywhere. When this time arrives, not forty-eight counties but eighty-seven counties in the state of Minnesota, as well as the counties of other states, will have the incidence of tuberculous infection among cattle tremendously reduced.

There will still be much work to do if only .28 of one per cent of the cattle of any state react to the tuberculin test. The tubercle bacillus has always been wily. It lurks in unseen places and when practically driven from its strongholds its enemies often stop the pursuit. It takes advantage of each opportunity to disseminate its kind. "A little leaven leaveneth the whole lump," and so it is with the tubercle bacillus. If we relinquish our efforts before it has been completely eradicated, soon the infection among cattle will be as great as it was before the campaign began. How easily this situation can come about may be illustrated by an instance of a certain farmer in Iowa whose herd had been tested and freed of infected animals. In order to prevent infection of his tuberculosis-free herd by the untested herd of his non-coöperative neighbor, whose pasturage adjoined his own, this farmer built a double fence which prevented any contact between the two herds. One need only pause and think to realize how universal this situation of adjoining herds is and how easily infection of one by the other could take place, thus cancelling the good or even possibly augmenting the harm, which had just been eliminated. But, someone has said, it is a physical impossibility to eradicate tuberculosis completely from the cattle family. This may be true, but persistent effort will keep the incidence of disease and infection so low as to make it of very minor significance.

The splendid work which has been done to control tuberculosis among other animals, such as swine, deserves much credit. The time is at hand when we must advocate that all food-producing animals as well as those coming in contact with human beings, such as pets, be placed under the observation of veterinarians for tuberculous infection and disease.

TUBERCULOSIS DEATH-RATE DECLINING

In the past fifty years and particularly the last quarter of a century, there has been a marked decline in the tuberculosis

death-rate in the human family. Figuratively speaking, we awoke one morning and found that the incidence of tuberculous infection among girls and boys and young adults was less than half what we believed it to be in many parts of the country the night before. We had been pasteurizing milk in some of the great cities; we had been teaching the people to render foods derived from animals safe for human consumption by cooking and boiling; we had been reducing the incidence of tuberculous disease and tuberculous infection through the tuberculin test and the slaughtering of animals found to be infected; we had reduced the possibilities of contact exposure with human cases of tuberculosis through teaching people how to prevent the spread of their bacilli in and out of institutions, and yet we were terribly surprised. If it were true that the incidence of infection has not been reduced and there is no hope of reducing it still further, the veterinarians, physicians and nurses better lock their doors and declare to the world that their work has been a miserable failure.

Now that the incidence of infection is quite low in many parts of the country, we are able, through the tuberculin test, to seek out those strongholds among the people of a community, regardless of race or age.

Area testing of cattle was introduced and practiced by veterinarians for a long period of time. In fact, not until sixteen years after the veterinarians were using the tuberculin test in cattle was a satisfactory and safe test for the detection of tuberculous infection in the human body perfected. In 1915, universal administration of the tuberculin test for infection among school children was advocated. A very prominent physician strenuously opposed this procedure, on the ground that all children have been infected by the time they reach the 'teen ages. Therefore, what good would be derived from such testing, or what could be learned from it? This physician may have been right in his day, but conditions have changed in many parts of the world and there is no more reason why we should cling to his views than we should ply the seas with the same equipment as Columbus used.

PHYSICIANS TAKE UP AREA TESTING

Very recently, a few physicians have been willing to adopt the area-testing method which they learned from the veterinarians. What has been accomplished, and what are its future possibilities? Although it has been carried on in a very limited way and in a comparatively small number of places, area testing of children

has brought to light some very striking facts about tuberculosis, and promises to be our best aid in detecting cases. In the first place it has taught us that in some places in the United States the incidence of tuberculous infection is quite low, even among girls and boys of high-school age, having been reported as low as ten and fifteen per cent for this age period. Area testing of children has also taught us that there are certain parts of the United States where the incidence of infection is still high, perhaps as high as it was twenty-five years ago, when the tuberculosis campaign began. Such findings as these point to the foci of tuberculosis in the country, and tell us where to concentrate our efforts.

The fact that a very high incidence of tuberculous infection exists in one place, and a very low incidence in another should not necessarily cast any reflection upon the work of the former place. Conditions may be such as to require a much greater amount of work in that place to reduce the incidence of infection. In a great city, for example, one may have to deal with large numbers of people who are unable to understand the English language, with others who show no interest in health work. Then again such a city may be infested with those who oppose all scientific methods of controlling disease and insuring the good health of the public. Again, one must not overlook the fact that such a communicable disease as tuberculosis spreads by contact. Therefore, the more people who come in contact with the spreaders of tubercle bacilli, the higher the incidence of infection will be.

URBAN CONDITIONS FAVOR SPREAD

The great city, because of the crowded conditions and the large numbers of contacts, is a favorable place for the tubercle bacillus to find its way from its victim to those whom it seeks to destroy. In a rural community, on the other hand, the number of contacts with the tuberculous patient is relatively small. Usually such communities are not hampered by those who oppose all scientific procedures. In other words, the conditions are much worse from the standpoint of the tubercle bacillus. In such places it is doubtful whether the incidence of tuberculous infection ever was as high as we once believed it to be, unless the infection was produced by the bovine type of tubercle bacilli, which could easily have resulted in universal infection by the time the 'teen ages are reached. Be that as it may, the very encouraging fact remains that the incidence in many communities is now very low.

Since it is such a well-established fact that tuberculosis is a communicable disease, and that everyone who has been infected with tubercle bacilli has been in either direct or indirect contact with some person or some animal suffering from the disease or acting as a carrier, we obtain very definite information about the child from the tuberculin test. If the test is positive we cannot proceed as the veterinarian does with animals, by destroying his body and all the tubercle bacilli it contains. His is a human life which we must endeavor to save and extend by every known method. The question that immediately arises in every case is: What is the source of the tubercle bacilli? Is it from the animal herds, that is, does he live in a part of the country where pasteurization ordinances are not effective or where the veterinarians have, through lack of funds or coöperation of the people, been unable to bring under control tuberculosis among animals? If this is true, the physician's first duty is to bring to the people of that community some facts concerning the bovine type of tuberculosis. Then he must endorse everything that the veterinarian recommends. Not only that, but he should work with the veterinarians at public meetings, among the families of his clientele where he has so much influence, with the hope of first having all bacilli destroyed by heat, whether it be by pasteurization in the towns and cities or simply by bringing it to the boiling point on a country-home kitchen-stove, and also with the hope that funds will be provided and coöperation will be secured so that the veterinarian will be able to bring tuberculosis among the animal herds of that community to the irreducible minimum.

CHILDREN SHOULD BE PROTECTED

Simultaneously, the physician should have in mind the human associates of every child who reacts positively to the tuberculin test, and should inform them of their responsibility in protecting children from further exposure to tubercle bacilli. When all physicians get the viewpoint of one of my friends in pediatrics, tuberculosis control will advance much faster than at present. Two children were brought to this pediatricist for general examination. He applied tuberculin tests and found that each of them reacted to a three-plus degree. He was unable to find any evidence of tuberculous disease, but he did not say, "This is of no significance, all children are infected." He knew better, he had kept abreast of the times, but he immediately said to the family, "Someone has infected these children." He said, "someone"

because an excellent pasteurization ordinance is in effect in the city where these children live. He talked to the family so convincingly that the parents and grandparents agreed to have a very complete examination for tuberculosis. When this procedure is carried out by physicians everywhere, the source of infection will frequently be found among the close human associates. If that source is not stopped, the future health of the child is jeopardized.

Area testing of human beings, therefore, is quite new. It has not been practiced so very extensively, but without exception where it has been practiced it has brought to light extremely valuable facts concerning tuberculosis of the community. Not only is this index important, but even more important for the ultimate success of the control of tuberculosis and for the individual concerned is this early detection of this disease. The veterinarian who discovers and kills or isolates the infected animal is striking at the very tap-roots of the disease. The analogy holds true in the human family. The infected case that is discovered and taught how to prevent any further encroachment of the disease upon his health is not only saved immeasurable illness and sorrow, but the potential danger of his becoming a source of further transmission of the disease is stopped as well. To wait until his disease has advanced to even the incipient stage is to neglect a golden opportunity which can never be recaptured. Only through the diagnosis and care of the infected case, as the veterinarian does, can tuberculosis in the human family ever be adequately controlled. Thus, the fact is apparent that area testing of human beings is worth many times the effort and expenditure of money involved. Any procedure that has been proved and that will continue to prove of such value is deserving of general endorsement and use.

FUNDS AND COOPERATION, ESSENTIAL

The future possibilities of this procedure would seem to be almost unlimited, but like the veterinarians, the physicians and other health workers are already encountering difficulty in securing funds and proper coöperation of the people.

Everyone realizes just what an impediment such non-coöperation means, for in the human family as in the animal kingdom, relaxation of any of the means of treatment or prevention in any section of the country will quickly spell the dominance of the death-rate by tuberculosis again in a very short period. The incidence of infection has been reduced, as is shown by the

limited area testing of school children which has been done, but if we are to rest upon past laurels and let the improved means of diagnosis, treatment and prevention which are now at hand stagnate because of lack of proper understanding and appreciation of the importance and magnitude of the task ahead of us, the ground that has been gained will be quickly lost and an even greater problem will confront us than that of the past. What is necessary to carry on the work? Health education of everyone by word of mouth and by print on the basic facts of tuberculosis in man—its non-inheritance, communicability, susceptibility to heal if diagnosed and treated early, and its possible eradication if every effort is bent toward its destruction. Such organizations as are here represented hold the balance in their hands, since their coöperation or lack of coöperation will mean the success or failure of the attempt to control tuberculosis in animals and man.

DISCUSSION

PRESIDENT WIGHT: We are certainly very grateful to Dr. Myers for the excellent address he has given us.

The program has provided for a little discussion of Dr. Myers' paper. I will call upon Dr. W. J. Butler to open the discussion.

DR. W. J. BUTLER: Mr. President, Dr. Myers and Gentlemen: I heard Dr. Myers talk in Salt Lake City last summer, and I have heard him today. I think I will gladly travel 1,000 miles to hear him again. (Applause) He brings to us a message that we can't forget. Two vital factors did he bring out, and one is area testing. In the control or in the eradication (and I believe it possible to eradicate glandular type of tuberculosis in cattle) we will have to depend upon area testing. We will have to take a cross-section of all of the cattle in any area and then wipe out the areas of infection. These nests of infection are the dangers of tuberculosis.

Dr. Myers told you that some people thought that the climate would eradicate tuberculosis. I remember in Montana, quite a number of years ago, we received letters from persons in eastern states asking us if it were not a fact that tuberculosis did not exist in Montana. They said that they had heard that if it was imported in there by other cattle it would die out of its own accord. Nothing was ever more erroneous. We can get just as much tuberculosis in the western country as you can in the eastern country, provided that the cattle are subjected to constant mass infection. The other saving grace was the fact that we required the tuberculin test and the sixty- or ninety-day retest of imported cattle. If it had not been for these two facts, one that the cattle were widely spread and the other that we endeavored in every way to head off infection being brought in to us, we would have had just as much infection, just as much tuberculosis, as any other state or any other section in the world.

The other message that appealed to me was the statement by Dr. Myers that the tubercle bacillus lurks in unseen places. I think that we should remember that as being of tremendous importance. You know that as we clean up the glandular type of tuberculosis and we think we have eradicated it in a certain area, then we begin to find the so-called skin lesions and the so-called teat lesions caused, apparently, by an acid-fast organism. We have never been able to cultivate this organism. We have never been able to reproduce it in any of our experiment animals. Yet morphologically it resembles the tubercle bacillus of the bovine type. That means to me that after we clean up our so-called glandular tuberculosis we will have to have everlasting vigilance to see that tuberculosis never again can develop, should these acid-

fast organisms be those of an attenuated type, an acid-fast organism resembling the so-called hay or timothy organism.

I remember in a certain section of the West we were tuberculin-testing dairy cattle. We found approximately 40 per cent of the animals tested were infected with tuberculosis. This was many years ago. We found also that many of the children on these dairy farms showed the glandular type of tuberculosis.

The President of the State Board of Health was a member of the Live Stock Sanitary Board, and he said, "I will go with you to these particular dairies, and we will find out what kind of tuberculosis this is," and he did. We found that these children were affected with the bovine type. Many things play important parts in life. We endeavored to require compulsory testing, but we met with many objections. It was necessary for us to file a complaint against some of these objectors. They were taken into the police court, but the police magistrate would always turn them loose, for political reasons. His daughter became sick and died. The county health officer made a postmortem on this young lady's body and demonstrated that she had died of tuberculosis of the bovine type. When this magistrate heard that, he was the same as an insane man. Always after that there was no trouble to have cattle in that community tuberculin-tested. But it is unfortunate that it had to take the death of a young lady before we could secure that assistance. These are the things that come along. Education plays a great part in all of this work. People, when they realize that you are going good, will assist you. But there are many fanatics that do not believe in modern medicine. They probably have a right to their opinion individually, but we will have to combat that if they try to foist it on a community at the expense of that community. (Applause)

PRESIDENT WIGHT: Dr. C. H. Hays will continue the discussion on this subject. (Applause)

DR. C. H. HAYS: It was my privilege and great pleasure, as with Dr. Butler, to listen to a discussion by Dr. Myers on a previous occasion. His discussion at that time, as before this Association today, dealt with fundamentals of hygiene pertaining to disease prevention and control with which those here are more or less familiar. It was our pleasure to have Dr. Myers on the program of the annual meeting of the Nebraska Anti-Tuberculosis Society, at Lincoln, the past spring. I desire to say to the Doctor that I have greatly enjoyed these privileges of listening to his able and interesting presentations on this most important subject. It is hoped that Dr. Myers will be afforded opportunity to carry his message far; and as a result, which may be expected, a more serious appreciation and recognition will be had, among those we serve, of the fundamentals of disease control, prevention and eradication which underlie the work with which he is engaged.

This is said with a somewhat selfish motive. It has no doubt been impressed upon you, as on myself, the similarity in the fundamentals outlined by Dr. Myers as essential to the control and prevention of tuberculosis in the human to those fundamentals which have been basic in the methods and plans adopted, in a large part through the efforts of this Association, for the eradication of tuberculosis among domestic animals. The source of tuberculous infection must have our primary attention in dealing with animal tuberculosis, and this obviously can be applied to a degree and in a measure along veterinary lines not to be obtained for combating the disease among the human. No priority claim can be established of the recognition of such fundamentals, as they have long occupied a most prominent place in medical science, but the application of the same in the eradication of bovine tuberculosis now in progress in the United States and Canada must be accepted as the most extensive and practical use as yet attempted. We are happy to remind you of the great progress now being recorded.

Our attention has been called by Dr. Myers today to the vital necessity of dealing immediately with the source of infection to overcome tuberculosis in the human. In the campaign against tuberculosis among cattle our efforts have been given to disclosing and to destroying sources of infection. At this point may I call to your attention a paper placed in the proceedings of the 1929 meeting of this Association, by Dr. L. Van Es, on "The Sources of Tuber-

losis." (See JOURNAL A. V. M. A., March, 1930, page 397.) I do this with a full recognition of the paper presented by Dr. Myers, but the statements by Dr. Van Es interlock in a manner the application to be made of the thought set forth by Dr. Myers in dealing with future eradication of animal tuberculosis.

It is correct to say that the public eye, focused upon the campaign against bovine tuberculosis, has more commonly seen the same as a "test of cattle." Though this is a narrow conception, the value of the tuberculin test as an instrument to detect sources of tuberculosis has thereby become more fully established and recognized. In keeping with the classification by Dr. Van Es in the article referred to, these tests have revealed primary sources of infection, the more potent sources and the ones to which Dr. Myers has directed our attention as often lacking the proper attention for dealing with human tuberculosis.

There is another source of tuberculosis which is classified as secondary, by the reference given, and named "polluted environment." The efforts to overcome the latter have not been so uniform nor constant as have been the efforts expended to eradicate primary sources, represented by reactor cattle. The slaughter, and by that the destruction of the infection which is contained in reactor cattle, has been uniformly adopted and applied, but the cleaning and disinfection or other practices to destroy the disease-producing hazards of contaminated premises have been handled in a variable manner.

It is pertinent to remind you that the authority I have chosen gave warning of the probable increased importance that will become attached to secondary sources of infection after the primary sources are more greatly reduced and eradicated. To maintain tuberculosis-free herds and areas, measured by the rules of our own making in the uniform methods and rules adopted by this Association, is the challenge. The laboratory and research investigators, through their studies, have unfolded the truths which have been so valuable to our determining the best ways and means for handling this eradication work. This same assistance has directed in a measure the adoption of the plans and methods. We now reach a point which in my estimation will demand that the routine field workers, who have so ably carried the work thus far completed, must become greater students and give even keener attention to the cases of tuberculosis established to determine, if you please, the source or probable source of infection involved.

The progress made in the eradication of bovine tuberculosis, as represented particularly by modified tuberculosis-free accredited areas, is very striking. The full measure of such progress will come with reaccreditation at the end of the three-year intervening period from initial accreditation. In Nebraska twenty-four counties have been reaccredited following retests, but in two of these a second general retest of all herds was necessary. These two were counties, it may be explained, that were greatly exposed to untested areas, as they were among the first counties to be accredited. Nevertheless, they represented areas in which the incidence of infection was recognized at one time not to exceed five-tenths of one per cent. Sources of infection has been the question concerned and has received a reasonably close attention but not sufficient at all times to place those in charge and responsible in position to defend the program of work to the extent necessary for the best interests of the work.

We must be conscious that to maintain areas in the status which has been our common goal must receive continued attentions. I take exception to any who seem unmindful of the value in the work completed when they remark that all will be lost if activities be now stopped. Were all activities discontinued, the eradication completed to date would forever justify the expenditures incurred. However, it is better economy to continue and determine ways and means for maintenance that will be sound and commercially justifiable. This problem will tax our best efforts in the future to as great a degree in my opinion as ever in the past. We may therefore most fully appreciate the good work of the medical profession, as represented here by Dr. Myers.

DR. E. A. CROSSMAN: I move that we extend a rising vote of thanks to Dr. Myers for his excellent address.

The motion was regularly seconded and was carried unanimously by a rising vote.

PRESIDENT WIGHT: We will have the report of the Committee on Tuberculosis. Dr. T. E. Munce will present the report.

Dr. Munce read the report, by paragraphs. These were adopted as read, with the exception of the first, action on which was deferred until the other paragraphs had been acted upon. A motion to delete the words "or breeding" from the first paragraph was defeated, after a lengthy discussion, following which a motion to adopt the recommendation as presented was carried.

REPORT OF COMMITTEE ON TUBERCULOSIS

Dr. T. E. MUNCE, *Chairman*, Harrisburg, Pa.

Dr. M. Jacob, Knoxville, Tenn.

Dr. W. F. Crewe, Bismarck, N. Dak.

Dr. Chas. E. Cotton, Saint Paul, Minn.

Dr. T. S. Rich, Lansing, Mich.

Dr. A. J. Dickman, Boise, Idaho

Dr. George Hilton, Ottawa, Canada

Your Committee recommends that the Association request the Secretary of Agriculture, U. S. Department of Agriculture, to amend regulation 7, as follows: "That cattle that can be used for dairy or breeding purposes for movement interstate must originate in herds under official federal and state supervision for the control of tuberculosis," said amendment to become effective July 31, 1932.

Your Committee recommends that the Individual Accredited Herd Plan be amended by striking out the last paragraph of Sections A and B of Section 11, which paragraphs read as follows:

Section 11—ADDED CATTLE

- (a) From a herd not under supervision, which passed one complete herd test by an approved veterinarian, subsequent retest to be applied in from 60 to 90 days, during which period additions must be kept separate from the herd.
- (b) From a herd not under supervision, which has passed one complete test by an approved veterinarian, a subsequent retest to be applied in from 60 to 90 days, during which period additions must be kept separate from the herd.

Section 11, as amended, would read as follows:

Section 11—ADDED CATTLE

- (a) Cattle may be added to an accredited herd in accordance with the following provisions:
 - Originating from an accredited herd.
 - From a once-tested, free herd on one additional test applied n from 6 to 90 days, and during such period kept separate from the herd.
 - From a modified accredited area, subsequent retest to be applied in from 60 to 90 days, during which period additions must be kept separate from the herd.
- (b) Cattle may be added to a once-tested, free herd in accordance with the following provisions:
 - From accredited herds; once-tested, free herds; or modified accredited areas, without further test.
- (c) Cattle added to other herds under this plan, unless complying with the provisions of paragraphs (a) or (b), shall pass two official tuberculin tests applied at an interval of from 60 to 90 days, and during such period shall be kept separate from the herd.

Your Committee recommends the following amendment to Section 25 of the Modified Accredited Area Plan, adopted December 4, 1925:

That this Section (25) be amended by deleting the comma and inserting, in lieu thereof, the following between the words "per cent" and the word "may": "and also modified accredited areas that have been re-accredited, in which, on the last complete tuberculin test of all the cattle in said areas, the extent of infection exceeded one-half ($\frac{1}{2}$) of one per cent and was less than one (1) per cent."

Section 25, as amended, will read as follows:

Section 25—"Modified accredited areas, in which on the original test of all cattle in said areas, the extent of infection did not exceed two (2) per cent, and also modified accredited areas that have been re-accredited, in which, on the last complete tuberculin test of all the cattle in said areas, the extent of infection exceeded one-half ($\frac{1}{2}$) of one (1) per cent and was less than one per cent, may be re-accredited if less than one-half ($\frac{1}{2}$) of one (1) per cent react as the result of retesting at least twenty per cent of the total number of herds including all previously infected herds."

Your Committee recommends the following amendment to Section 25 of the Modified Accredited Area Plan, adopted December 7, 1926.

Amend by inserting the following between the words "re-accredited" and "if": "and also modified accredited areas that have been re-accredited in which, on the last complete tuberculin test of all the cattle in said areas, the extent of infection did not exceed one-half ($\frac{1}{2}$) of one (1) per cent, may be re-accredited."

Section 25, as amended, will read as follows:

"Modified accredited areas in which, on the original tuberculin test of all cattle in said areas, the extent of infection did not exceed one-half ($\frac{1}{2}$) of one (1) per cent, may be re-accredited and also modified accredited areas that have been re-accredited in which, on the last complete tuberculin test of all the cattle in said areas, the extent of infection did not exceed one-half ($\frac{1}{2}$) of one (1) per cent, may be re-accredited if less than one-half ($\frac{1}{2}$) of one (1) per cent react as the result of retesting all previously infected herds and such other herds as the state live stock sanitary official and the federal inspector in charge may designate and which shall include, so far as possible, all herds to which cattle from which other than accredited herds or modified accredited areas have been added."

Your Committee recommends the following as an addition to the Modified Accredited Area Plan:

"Provided that a county or area may be accredited in the range or semi-range areas if all bulls, pure bred breeding cattle, milk cows, at least 10 per cent of the semi-range breeding females, and such other cattle as may be considered necessary by the state and federal departments coöperating are tuberculin-tested. Provided, that if a reactor or any other evidence of infection is found in any herd by postmortem reports, including post-mortem inspection at packing-plants, of those branded cattle that are sold direct from the range for immediate slaughter, then all of the cattle in that herd or associated with the diseased animal shall immediately be tuberculin-tested in accordance with the provisions of the Modified Accredited Area Plan, and the area accredited if not more than $\frac{1}{2}$ of 1 per cent of all the cattle tested in the area react to the test."

Your Committee recommends that paragraph (b) of Section 25 of the Modified Accredited Area Herd Plan, which reads as follows: "If at least one (1) herd located in each township or district," be eliminated from the plan.

Your Committee recommends that the President of the Association appoint a representative to attend the conference to be held December 9, 1930, in New York City, to advise with the New York City Department of Health and Certified Milk Commission in the matter of formulating requirements covering the tuberculin-testing of herds producing certified milk. The necessary expenses of said representative to be defrayed by the Association.

Your Committee recommends that the proper official of the U. S. Bureau of Animal Industry be requested to confer with the U. S. Public Health Service in order to obtain recognition and, if possible, the adoption, in connection with their Standard Milk Ordinance, of the tuberculin tests of herds as conducted under the Modified Accredited Area Plan in which the areas have been accredited, or the infection is less than one-half ($\frac{1}{2}$) of one (1) per cent of all cattle in the county.

PRESIDENT WIGHT: The next speaker will be Honorable Charles L. Hill, chairman of the Department of Agriculture and Markets, Madison, Wisconsin. (Applause)

HONORABLE CHARLES L. HILL: Mr. Chairman and Gentlemen: Just why I should have accepted an invitation to speak to this technical group is just beyond my comprehension. The only excuse I can give is the fact that I have always admired the work that you have done and have been conversant with it, more or less, for many years. I have from time to time dropped in during this International week for one-half hour or an hour with you. I was in a little while yesterday. It was more to show my appreciation of your work than anything else that I foolishly accepted this invitation.

Honorable Charles L. Hill then read his paper, entitled, "The Importance of Sanitation in the Prevention and Control of Bovine Tuberculosis."

THE IMPORTANCE OF SANITATION IN THE PREVENTION AND CONTROL OF BOVINE TUBERCULOSIS

By CHAS. L. HILL, Madison, Wis.,

Chairman, Department of Agriculture and Markets

The present trend, in both human and veterinary medicine, is in the direction of preventive rather than curative medicine. Sanitary science as applied to domestic animals has made rapid strides in the past fifty years. The various discoveries in the fields of bacteriology, parasitology and other sciences gave to the sanitarians the necessary information to formulate disease-control programs with which they could set out to conquer devastating animal plagues.

Tuberculosis in cattle, before control measures were undertaken, was considered as the captain of the destructive diseases. It is difficult for some to obtain an accurate conception of the seriousness of the economic losses as a result of the ravages of this disease.

A bit of personal experience will indicate to you how hopeless a situation we were up against before the tuberculin test was made practical and a definite, tuberculosis-control program adopted. From these instances I think your imagination will readily tell you what the conditions would be by this time if we had not had the help of the tuberculin test and a well-organized sanitary program.

In May, 1887, my father and I purchased our first Guernseys and among the lot was a heifer calf that had recently come from Pennsylvania. We found, as soon as we got her home, that she was not doing well. Two or three months later she died and a portmortem examination made by a local physician showed that her lungs had extensive lesions of tuberculosis. While in our possession this animal associated with two other heifer calves. These later showed evidence of having the disease so they were killed and disposed of. Fortunately this stopped the spread of the disease in our herd.

A young man of means living twelve miles away from my farm bought some Guernseys, also in May, 1887, and added rapidly to his herd in 1888 and 1889. Later he found his cattle dying off with what proved to be tuberculosis. At that time there was no method of controlling tuberculosis. This young man, thinking it was useless to continue, became discouraged and sold one hundred head of pure-bred Guernseys to a glue factory. He, also, was so conscientious about the matter that when he found out exactly what the situation was he even destroyed the butter he had on hand made from these cattle. •

If such conditions existed forty years ago, when the cattle population in the State was sparse and the interchange of cattle not so frequent, what could we expect in Wisconsin today with a cattle population of three million and frequent interchange of cattle? The answer to the question is that the dairy industry would not have developed to its present proportions.

Although bovine tuberculosis in its relation to public health often occupied the center of attention when control measures were being sponsored, the herd-owners always knew that drastic control measures were justified from the standpoint of the economics of the disease.

The discovery of tuberculin provided a very valuable means to detect tuberculous animals before the disease progressed to the advanced stages. Definite control plans were initiated by the various states and the federal government. Finally the intradermic method of tuberculin-testing was proved practical and it opened the way to apply the tuberculosis-control program on a state-wide and nation-wide basis. The tuberculin test, as we have it today, enables us to select the infected cattle with a high degree of efficiency. Authority through legislative enactments enables us to dictate the disposal of reacting animals. The very high majority of reacting cattle are directed to slaughtering establishments having federal meat inspection service. All diseased carcasses, organs, or parts are sent for sterilization.

DISEASED ANIMALS GREATEST RESERVOIRS

The greatest reservoirs of the tuberculosis germs are the diseased animals themselves. These virtual storehouses of vast quantities of tuberculosis germs are sent to market in enormous numbers. Efficient handling of the infected carcasses by the federal inspectors assures positive destruction of the vast amount of tuberculous tissues containing uncountable billions of tuber-

culosis bacilli. This method is rapidly depleting the tuberculosis germ population among the herds of the nation. It would be well nigh impossible even with the most vivid imagination to conceive a method more effective for destroying large numbers of tuberculosis germs than the tuberculin test, indicating the hosts housing millions of germs, and the control method, compelling the destruction of host, germs and all.

If the detection and disposal of reacting animals was sufficient to suppress the disease, the problem would be a comparatively simple one. However, such is not the case. The test itself, although highly efficient, does not in all instances enable one to pick out all the animals carrying tubercle bacilli. Badly infected cases, saturated with the products of the germs, become desensitized and will not respond to the injection of tuberculin. Fortunately these cases are few in number and are becoming rapidly fewer because the advanced cases are becoming fewer.

Another condition which does not enable the test to disclose all animals carrying germs is where the infection is recent or incipient and not sufficiently advanced to sensitize the animal body so as to enable it to give a response to a tuberculin injection. It is also thought that animals may become infected and later the infection becomes localized and walled off so effectively that the progress of the disease is checked and the production of sensitizing elements stopped. Such sensitization as is present may eventually disappear and then, if a test is applied, no reaction occurs.

Later on, due to the strain of heavy milk-production, lack of proper nutrition or the frailties of old age, the old calcified lesion may break down and the infection spreads in the system to such an extent that an open case results and the infection contaminates the environment and spreads to other members of the herd. This condition offers a logical explanation in an outbreak of the disease in herds that have been originally infected, then annually tested and found free for a number of years and then a flare-up of the disease occurs without any history of exposure.

LIMITATIONS OF TUBERCULIN TEST REALIZED

The limitations of the test in not picking out all the infection are fully realized and the program is so modified as to circumvent the shortcoming. In our state, infected herds are retested at six-month intervals until a completely negative test is obtained. In reviewing the history of a number of infected herds we find

that subsequent to a negative test infection is again disclosed. This condition points to the advisability of following up infected herds with retests at six-month intervals until at least two negative tests are obtained.

Spreaders, or "open cases," as they are sometimes called, may cast off tuberculosis germs from the system by coughing, nasal secretions, urine, feces, milk, vaginal discharges or running tuberculous sores. When the respiratory organs are involved, the animal may cough and spread particles of moisture and germs into the air where they may float around and be inhaled by other animals or settle on and contaminate available feed. The act of coughing may bring many germs into the mouth. The cow usually swallows these and most of them pass through the digestive system unharmed and pass away with the feces in a virulent form.

The presence of germs in the environment where infected cattle are found makes it necessary to employ a system of sanitation to rid the physical surroundings of infective material. Experiments indicate that tubercle bacilli will remain alive under favorable conditions for more than a year. Dampness and darkness favor the longevity of the germs. Dryness will shorten the life of the germs, while direct sunshine is very effective as a germicidal agent.

A good system of sanitation involves living conditions so arranged that all external conditions and all phases of management are conducive to good health and any exposure to diseases prevented. With proper sanitation we must reckon with type of soil, topography of land, kind of building, ventilation, nutrition, cleanliness, method of handling manure, disinfection, and other management features.

Type of soil and topography may determine the persistence with which the infection may stay on a place or the rate with which it is spread. A flat, heavy, non-pervious soil containing pools of water is best suited to rapid spread and longevity of the disease.

PROPER ATTENTION TO HYGIENE

Buildings providing proper shelter and sufficiently warm for animal comfort in the colder sections are necessary for health and good animal economy. Ventilation admitting sufficient fresh air, with the avoidance of drafts and dampness, is most essential. Plenty of sunlight is always desired. A clean barn, well ventilated, with plenty of light, makes a healthful and delightful place to

house animals. Such conditions do not favor the presence of disease germs.

Nutrition is most important. In herds where tuberculosis is prevalent, even the best system of feeding may not prevent the spread of the disease because massive infection can overwhelm the natural resistance and vigor present in well-nourished animals. Proper feeding combined with good living conditions such as fresh air and moderate exercise will enable the body to ward off or arrest the progress of tuberculosis infection. This is nicely exemplified by results obtained in human beings afflicted with the disease. The body properly cared for does more to overcome the disease than all the medical cures offered to relieve this ailment. With cattle we are not concerned with curing or arresting this trouble. We are, however, concerned with the good vigor that will offer the maximum amount of natural resistance.

Since the excretions from diseased animals are very apt to contain live germs, the manure pile must always be considered as a prolific source of danger. If manure is kept near the barn, as it is in many instances, cattle and other live stock should be kept away from it. Many farmers find it possible to haul the manure into the field daily for application to the land or temporary storage. With this method it can be handled in such manner as to conserve to the highest degree the valuable plant food nutrients it contains and in infected herds it ceases to be a source of danger. Cattle should not be grazed on land to which manure from an infected herd has been spread, for at least one season.

On farms with infected herds the yards and pastures may contain infective material and be a source of danger, but this source of infection is not so important as germs that are present in the barn itself.

SOIL DISINFECTION NOT PRACTICAL

There is little that can be done to destroy the infective material on the outside other than proper handling of the manure, providing good drainage in yards and pastures and rotation of pastures where possible. Natural forces, such as the sun and other elements, tend to destroy or devitalize tubercle bacilli. Disinfection of the soil is not practical and should not be attempted.

Barns that have housed infected herds must be given special attention. Next in importance to removal and proper disposal of the reacting animals is the thorough cleaning and disinfection of the barn itself. In Wisconsin we issue printed instructions out-

lining the method of cleaning and disinfecting. Specifications on the kind of disinfectant to be used are given. The veterinary inspector, at the time the animals are condemned, supplants the printed directions with verbal instructions, pointing out in detail everything that has to be done. After the premises have been cleaned and disinfected a veterinarian returns to make an inspection. If the work has been carried out according to instructions approval of the work is granted. Personal supervision of the cleaning and disinfection operation by a veterinary inspector would, no doubt, be more desirable, but such a system is not practical in most instances, due to the high cost of operation. The provision that indemnity will not be paid until the cleaning and disinfection process has been completed according to directions serves as an effective means to have the work done efficiently.

Tuberculosis-eradication work in our State is progressing at a satisfactory rate. Every county in the State has been area-tested at least once. Fifty-nine out of the seventy-one counties are modified accredited. Five more counties are expected to be modified accredited within six months. It is anticipated that all the counties in the State will be modified within three years. We will apply the test on a million cattle during this year and our future schedule calls for a million a year.

It is gratifying to observe the marked reduction in infection disclosed by area retests. In the first area test on all the seventy-one counties in the State, 3,140,000 cattle were tested and 2.8 per cent reacted to the test. The first area retest has already been applied, three years later, to 53 counties, with 2,173,000 cattle tested, with 0.4 per cent reactors. The third area retest has already been applied to 22 counties, having 736,000 cattle, and only 0.15 of one per cent reactors were disclosed.

PROGRESS MADE IN WISCONSIN

The figures indicate that the disease is rapidly yielding to our control. Our thoughts and aim are already directed at ultimate eradication of the disease. Promising data bearing on that ambition are already in evidence. Permit me to call to your attention the work in five counties in Wisconsin.

Lincoln County showed only moderate infection, 0.9 of one per cent on the first test, and on the last test, with 22,888 cattle, there were only 17 reactors or 0.08 of one per cent. Marathon, with 110,000 cattle tested, had 203 reactors, which is 0.18 of one per cent. A more drastic reduction is noted in Kenosha County

which, to begin with, had a heavy infection. On the first area test, 19,016 cattle were tested and 7,567 reacted, or practically forty per cent. On the first area retest, nearly three years later, with 22,273 animals tested, only 147 reacted, or less than two-thirds of one per cent. In the northern tier of counties, Vilas County had all its cattle area tested three times at three-year intervals. The cattle population of this county is 3,000. On the first area test in 1922, 9 reactors were disclosed. Two subsequent area retests in 1927 and 1930 did not reveal a single reactor on either test.

In view of what I have said I do not want to create the impression that our present system and method of control is entirely sufficient to effect ultimate and complete eradication of the disease in large areas. It appears that in some areas we are approaching an irreducible minimum. Various problems are coming to our attention which were not present or which were obscure when reactors were plenty. I will take the liberty to call to your attention three of these problems.

NO-LESION REACTORS RUN TWELVE PER CENT

I will first mention the no-lesion problem. In Wisconsin approximately twelve per cent of all the animals condemned do not reveal macroscopic lesions on postmortem examination. This ratio appears to remain fairly constant as the number of reactors decreases. We are not at all worried about this percentage of no-lesion cases in areas carrying considerable infection because we are convinced that the routine macroscopic examination does not extend an intensive search to every piece of tissue in the body and smaller lesions visible to the naked eye could be noted, in some instances, if such a thorough examination were practical and possible. Then we are also cognizant that the incipient or recent infection searched out by the tuberculin test cannot be observed by the naked eye. Only microscopic and biological methods would demonstrate the disease in these instances and such a procedure is not practical for routine work.

With this picture in mind we run into a no-lesion problem in areas having a light infection which we have good reason to believe is not produced by active or virulent tubercle bacilli. We frequently get reactors to the tuberculin test in areas having a light infection where there is no history whatever of previous infection, exposure or introduction of animals. In most instances only one animal gives a reaction. Postmortem reports in prac-

tically all such instances come back showing no lesions and in following up such herds no further reacting animals are found. The loss occasioned by this class of cases is not serious to the herd-owner, but it stirs up some discontent and produces a critical attitude among those affected. Then also in looking to the future, the status of complete eradication will be difficult to reach until this problem is better understood. It appears in these cases that a cause other than virulent tubercle bacilli sensitizes the animal to tuberculin.

The second question before us is: Can we ever hope to eradicate tuberculosis in cattle completely without giving definite consideration to the tuberculosis problem in other farm animals, poultry and even tuberculosis in humans? Such experimental evidence as is available indicates the flow of infection from cattle to humans and other farm animals. Now that we are reducing the presence of tuberculosis in cattle to a very small figure, is it not possible that the course of infection or possible sensitization is reversed and is being transferred from infected humans or other diseased farm animals or fowl back to the cow?

The last and probably the most important problem which confronts us is the skin-lesion problem. Investigators tell us that only a small proportion, if any, of the skin lesions resembling tuberculosis actually have virulent tubercle bacilli. It is our understanding that these lesions do contain acid-fast organisms which may, in many instances, sensitize the animal to tuberculin. In some localities the number of skin-lesion cases are negligible, while in other communities the reacting animals show a considerable percentage of skin-lesion cases.

In conclusion I just wish to leave with you my feeling of admiration for the harmonious and efficient manner in which the federal and state coöperating forces are handling the tuberculosis-eradication program. I could not close without paying tribute to the splendid spirit of coöperation on the part of all the people in the State. The farmers have welcomed the work with open hands and are giving us every coöperation. This is more significant than it may appear when you consider that when animals are condemned the farmer is compelled to absorb a portion of the loss and also the fact that the majority of herd-owners were not conversant with the actual motives back of this program. On the other hand, the city population has allowed to have itself taxed for the purpose of providing funds to carry on this work. It takes people of vision and understanding to give such coöpera-

tion. The investment the people of Wisconsin have made into this work is clearly showing its rewards in higher standards of public health and in increased efficiency in animal productivity.

DISCUSSION

PRESIDENT WIGHT: This valuable contribution to our program is to be discussed by two gentlemen. The first is Dr. C. P. Bishop, of the Pennsylvania Bureau of Animal Industry, Harrisburg, Pennsylvania. (Applause)

DR. C. P. BISHOP: Mr. President and Gentlemen: I am sure we enjoyed Mr. Hill's paper very much. I am glad, too, he didn't buy more than one heifer in Pennsylvania, but then it probably is a happy thought that we might have contributed something in getting Mr. Hill started on his tuberculosis eradication. We probably helped Wisconsin.

This discussion will deal largely with methods, underlying principles and practices as employed by the Pennsylvania Bureau of Animal Industry, as it pertains to cleaning, disinfecting premises and correcting faulty sanitation in connection with the tuberculosis-eradication program.

Cleaning and disinfecting infected premises, or "sanitation," as it might govern or influence the spread of infection in herds or influence the resistance of individuals, has been considered of paramount importance since Pennsylvania adopted a definite plan to establish and maintain tuberculosis-free herds of cattle.

It was evident then, as now, that the liability of infecting an animal with tuberculosis is increased in proportion to the number of germs that are administered to an animal by inhalation, feeding or inoculation. Therefore, since there are many more germs in the dirty and insanitary stable that is poorly lighted and ventilated, compared to the clean stable that is well ventilated and flooded with sunshine, the danger of infection in the former stable is greater than in the latter.

Any system of herd management that tends to reduce the vital resistance of animals by overwork, undue exposure, improper nourishment or to depress the activity of the organs or functions by insufficient use, will favor the spread of tuberculosis.

In the early years of our work, disinfection was done by Bureau agents using large hand-pumps operated by three men, two of whom were needed on the pump and one to handle the nozzle. This type of pump was soon replaced by a small hand-pump which required but two men to operate. This pump conserved labor, was more easily transported and more premises were disinfected with no loss in efficiency. Tuberculin-testing, under the Modified Accredited Area Plan, increased the number of premises to be disinfected, and the desire to do the work more efficiently, if possible, led to the replacement of the hand-pumps with combination gas engine and water-pressure pumps. The pump, with a $1\frac{1}{2}$ -horse-power engine, is mounted on a $1\frac{1}{2}$ -ton truck. The pump can be regulated to maintain pressure of 200 to 250 pounds, which is the amount used in ordinary spraying. The truck also carries one drum of cresol disinfectant and a mixing-drum, with sufficient hose and adjustable nozzle.

The State is divided into eleven field districts. An agent of the Bureau of Animal Industry is in charge of each district. To each district a trained disinfecter who has a complete spraying outfit is assigned. This man, known as a disinfecter, is specially trained in disinfection and sanitation and works under the direction of the district agent in charge. The details and coordinating of the disinfecting work, in coöperation with the district agent in charge, are under the supervision of a supervising disinfecter.

Under the Individual Accredited Herd Plan the expense of disinfecting premises, including the disinfecting material, is paid by the State Bureau.

The disinfecting under the Modified Accredited Area Plan is done in coöperation with county or township, where tuberculin-testing is being conducted. The coöperating agencies, such as herd-owners in the township or the county commissioners, furnish the approved disinfectant and pay the salary of the local disinfecter employed by the township or county to assist the state disinfecter

in operating the pump and visiting owners of premises scheduled for disinfection, to assure proper cleaning by the time the sprayer arrives at the premises. In this way four to eight premises can be disinfected daily.

Following the completion of the tuberculin test and appraisement of reactors under either plan, the owner is given, by the veterinarian who has conducted the tuberculin test, printed instructions to be followed, thoroughly to clean the stables, sheds and yards occupied by tuberculous cattle. The owner is shown the importance of cleaning premises before disinfecting can be effective.

The district disinfector schedules the premises to be disinfected and sends a notice to the owners when he will arrive to disinfect, so that the premises will be properly cleaned prior to disinfecting. A signed report of the disinfector giving the amount of disinfectant used, number of square feet disinfected, and time consumed in the work is forwarded to the Bureau office. This report is required before the claim for indemnity is paid.

Pamphlets are distributed giving important facts for each herd-owner whose herd has been tuberculin-tested under either plan. By way of contacts that are constantly being made through the veterinarian who conducts the test, the district agent in charge, the supervising disinfector and the disinfector, an effort is made to show the owner the importance of placing his premise in a sanitary condition and to follow reasonable and practical day-by-day sanitary precautions so that he can keep his premises clean at all times. Also that it is more difficult to establish and maintain a tuberculosis-free herd where the sanitation is defective and the premises dirty. And that sanitation in its broad sense means cleanliness, fresh air and sunlight. Sunlight, being the cheapest disinfectant known, is frequently excluded from many barns because of the absence of sufficient windows. It would result in a very good investment if additional windows would be installed.

A contributing factor in improving sanitation on all Pennsylvania farms where dairy animals are being maintained has been the assistance given to the work by veterinarians and lay inspectors employed by milk companies and municipal boards of health. Companies handling a product which is necessarily graded according to bacteria count realize the importance of sanitation. Without sanitation it is almost an impossibility to produce a wholesome milk, that is, one of low bacteria count. These factors as well as other contributing factors can be summarized as helpful in the movement for the prevention, suppression and control of tuberculosis and other communicable diseases and will serve as a barometer to the success of any plan adopted for that purpose, which will be directly proportionate to the intensity with which this prevention measure is practiced.

Without an intelligent understanding by the owners in matters pertaining to proper sanitation and adding cattle only from safe herds, the efforts of the state and federal governments would be futile.

PRESIDENT WIGHT: That is a very fine contribution to the subject.

Another who will discuss this is a gentleman from this state, who has not been on our program before, as I understand it. We will be glad to have Mr. H. W. Allyn, of Byron, Illinois, who is President of the Illinois Holstein Breeders Association, also Chairman of the Illinois Live Stock Sanitary Committee, discuss Mr. Hill's paper. (Applause)

MR. H. W. ALLYN: I am sure that since we have listened to Dr. Bishop's discussion of Mr. Hill's very valuable paper, there is very little I can add except by way of one or two little personal experiences that may be of some interest to you.

I am very glad that Mr. Hill brought out and emphasized for you the importance of the animals that are not picked up by the tuberculin test, as affecting your sanitation program. It certainly ought to be reinforced in the minds of all of us that that is a danger. Unfortunately, there is a feeling becoming prevalent in some quarters that we may relatively neglect the sanitation and place our entire dependence upon the tuberculin test as far as individual herds are concerned. Sanitation applied to the premises is of vital importance in the final result as far as the individual herd is concerned.

I am a firm believer myself in the practical common sense and dollars and cents value of sanitation as applied to that individual-herd problem. I feel

that any state neglecting that phase of its eradication program is willfully wasting the taxpayers' money.

I would recommend for the thoughtful consideration of you men representing the different states (and I don't except my own) the Pennsylvania plan. I have known of herds within this state where reactors have been repeatedly found on retest, with every indication pointing to infected premises as the cause.

If no other good was accomplished but to show the herd-owners what a real clean-up means when conducted under competent supervision, the expense of that supervision would, in my humble judgment, be fully justified. There are a great many herd-owners, unfortunately, in this and other states, from my observation, who haven't the slightest idea what a sanitary, clean premise really means. You men recognize the importance of sanitation as applied to all phases of animal disease control.

I am going to give you a little personal experience that may emphasize, and I just want to recall to your mind in mentioning it, too, some of the things that Dr. Myers told you this afternoon, because it seems to me it has more or less of a connection. It certainly confirms my belief in the importance of sanitation.

We bought another farm, some seven years ago, that kept a dairy herd for about two years prior to our purchase, and prior to that they had a herd of beef cattle on the farm. As far as I know, and I think I am correctly informed, none of these cattle ever was tested. But the dairy cattle that occupied the farm, two years before we got it, came from Wisconsin and, presumably, must have been tested before they entered the State. The barn was in terrible condition. No other word adequately describes it. An old plank floor raised about two feet above the ground level, on a rock foundation, made it utterly and practically impossible to disinfect the accumulated leakage material that collected between the ground and that floor. We needed the room for heifers. I realized the danger, and tried to apply the thorough methods of clean-up that Dr. Munce tried to reach me when I was down in his Department in Pennsylvania.

We scrubbed and scraped and sprayed. We hauled the manure out and scraped the yards with a road-scraper. We cleaned and disinfected the water-tank and provided another well. We put the heifers in for the winter with the confidence of the ignorant. A few that had freshened reacted, although the balance of the herd was clean and had been clean before. In six months, more having freshened, more reacted. To cut the story short, in two years my good friend, Dr. Legner, took practically every one of that group of thirty-five heifers away from us. He put us in touch, however, with that peer of all practical sanitarians, Mr. Quirk, of the B. A. I. He came and studied the problem and prescribed many things that were conscientiously carried out.

I would like to digress a moment and say it is a curious commentary on the usual efficient and highly satisfactory service we receive from the B. A. I. to find this man who has very peculiar and unique ability as a practical sanitarian, kept buried in a minor office where his services are not available, except by special request, to breeders or to other men who may need them.

The dairy cattle were kept away after this unfortunate experience, but the feeders and the hogs kept there were religiously tested, with no further trouble until this past summer. Then the hogs showed evident signs of tuberculosis infection in their udders and a general unthrifty condition. That was checked with postmortem examinations of a number of them. In the meantime, the walls around this old barn had a good many gaps in them. I am just as sure as I am standing here that that culture bed that had lain there all those years was responsible for the infection in those hogs. We scattered chlorid of lime over the top of that, within the limits of the practical possibilities of the situation, and at great discomfort to the men who were doing it, but that couldn't be expected, under those conditions, to head off the infection.

Now the barn is coming down after having cost us, in loss from cattle alone, more than the value of a new one. Do you wonder, then, that we at Rock River Farm insist that our visitors do not walk in front of the cows, or in other words, as I explain to these people, on the dinner plates of the cows. I, not recognizing him, even tried to put out the chief milk inspector of the city of Chicago, when he was found at one time in that part of the barn. I don't know whether he has ever forgiven me or not. I consider it a very necessary precaution in controlling disease that the visitors' feet be kept away from

contact with any surface that the animals' food comes in contact with. We disinfect, after thorough scrubbing, all of the barns and calf-pens at frequent intervals, whether any disease has appeared or not. I think that has a deliberate tie-up with the possibility that there might be an animal in there that carried infection, although the tests had not disclosed it.

Others have brought out the importance of precautions to be taken with added animals. I am sure that if we as herd-owners all conscientiously live up to the regulations of the B. A. I. and the advice of our own sanitary officials, we are not going to get into trouble on that point.

I wonder if I might be permitted, aside from this subject, since you have honored me alongside of Mr. Hill as being the only representative of the actual ownership of cattle at your meeting, to leave another thought. Perhaps as sanitary officials and veterinarians, the viewpoint of the fellow who is dealing with cattle on the farm might not always be worthless to you men in your work. The thought is the very unfortunate situation that still exists in connection with the abortion test as an interstate proposition.

I think Dr. Mohler owes it to the live stock industry of this nation to collect in some room big enough, in the city of Washington, or this city, if he prefers, all of you men from the various states who are responsible for the abortion regulations of your states. He should shut the door and inform you men that you were not going to eat or drink until you arrived at a uniform basis for those tests. (Applause) I am sure there is enough information available when the scientific men on your staff are brought to realize that the herd-owner really has some rights in this matter, to arrive at a satisfactory, practical and uniform test. Of course, you will amend that just as they amended the tuberculin regulations from time to time, as the conditions warrant. There is no reason why you shouldn't be able to so modify your abortion regulations.

I submit to you, Dr. Mohler (I don't see you in the room; I hope you are here; if you are not, I hope somebody will tell you), that you owe it to the live stock industry of this nation, for which you are responsible, just as all the rest of the men in this room are responsible. If there weren't a live stock industry, you fellows wouldn't be here. You owe it to us fellows, who have that problem, to settle it and settle it this winter. (Applause)

PRESIDENT WIGHT: There is one thing I should like to do before we close, and that is to call on Mr. Crabb, President of the Jersey Cattle Breeders Association. Won't you say a word to us?

DR. W. F. CREWE: This gentleman has been a friend of mine for many, many years. He has always been a wonderful booster and supporter of live stock sanitary control work, not only in our own state but now he passes the gospel on to the various states he visits. He has always been interested in the cattle industry, and more especially in the Jersey breed of cattle.

During his various wanderings this past season he contracted quite a serious illness. He eventually reached his home and was confined to his room. Dr. Schalk and I happened to be in the city, and we decided to visit him. We were told by the hotel manager that the doctor said he couldn't have any visitors. However, we phoned up and his wife conferred with him. He told her to tell us to come up. So we went up to his room and talked the situation over with him and gave him a little advice. Strange to say, after our visit, he started to get better. He went on and had an uneventful recovery. So we decided to advise him that if he was seriously ill, to be sure to consult a veterinarian. (Laughter)

MR. CRABB: Mr. President and Gentlemen: I appreciate the privilege of appearing before you at this time. I have made it my business, when visiting other conventions of interest in Chicago this week, always to find a seat here during your proceedings and try to learn something new about sanitation and control of the problems that confront us as breeders of cattle.

I always find a good many things of interest when I come here. You know, we are living in a very rapid age now. Things are moving along at a pretty rapid rate. In fact, it has gotten so now that when you are mighty sick and all the physicians can't find out what is the matter with you, a couple of veterinarians can visit you and you will shortly begin to mend. I don't know just what the influence is, but it obtained as Dr. Crewe said. They tried, among

other things, down there in New Orleans, to hang undulant fever on me, but I told them that I didn't want it even if they found the organism, because I would rather be a fever patient of an unknown origin.

But, as I said before, things are going along at a pretty rapid rate. We who are in the cattle business desire to keep up with the times. That is the reason I come up here and am interested in your deliberations. You know the radio of yesterday isn't much of a radio for tomorrow. In fact, you have got to run like hell nowadays to stay where you are. (Laughter) So I am the busiest fellow you ever saw, just visiting these places where a group of scientists are gathered to advise each other, and to devise ways and means for the better development of their problems. That is the reason I come to you, and I want to say to you that I am always repaid. (Applause)

. . . The session adjourned at 5:00 p. m. . . .

FRIDAY MORNING, DECEMBER 5, 1930

The fifth session convened at 9:40 a. m., President Wight presiding.

PRESIDENT WIGHT: The meeting will please come to order.

We have a very interesting program prepared by the Committee on Transmissible Diseases of Poultry. Unfortunately, Dr. Schalk cannot be with us. He has worked very hard on this program and has prepared something rather unusual. A number of these subjects are very new. It is Dr. Schalk's desire, and the desire of the Committee, that the program this forenoon be considered as a Committee report and published in the proceedings of the meeting as a whole, because it is sort of a summary of these new features in diseases of poultry.

The first paper was prepared by Drs. A. F. Schalk and M. C. Hawn and will be presented by Dr. Stubbs, of the University of Pennsylvania. (Applause)

. . . Dr. Stubbs then read the paper. . . .

AN APPARENTLY NEW RESPIRATORY DISEASE OF BABY CHICKS

By A. F. SCHALK and M. C. HAWN, Fargo, N. Dak.*

North Dakota Agricultural College

The very sudden and almost precipitous occurrence of an acute and quite fatal respiratory disease among baby chicks furnished the occasion for a brief though special study of the condition, the results of which supply the information given in this discussion.

INTRODUCTION

In the brief period of a few days, about the first of April of the present year, there were brought to the veterinary laboratories of the North Dakota Agricultural College, through the mail and personal visits from hatcherymen and poultry-keepers, an unusually large number of dead or markedly sick baby chicks, manifesting peculiar charactersitic gasping symptoms.

Inasmuch as we had never encountered a similar condition in baby chicks with the same history and symptomatology during our twenty years of laboratory and field experience and were

*Resigned, July 1, 1930.

unable to find this identical condition recorded in veterinary pathology, we are tentatively referring to it as "an apparently new respiratory disease of baby chicks."

DISTRIBUTION AND ECONOMIC CONSIDERATION

Our own observations found the disease quite commonly distributed throughout eastern North Dakota and western Minnesota. However, it is quite evident that it was present also in many areas throughout the wide expanse of territory of the central states during the spring baby-chick season. We soon learned through hatcherymen and veterinarians, and representatives from a number of poultry supply houses, that what appeared to be an identical disease was being encountered in Mississippi, Louisiana, Ohio, Illinois, Nebraska, Iowa and South Dakota. Probably many other states also were invaded.

While this condition had a very extensive territorial distribution, it was by no means general throughout the affected districts, as some large areas were comparatively or entirely free from the disease. Again, in certain localities where practically all of the broods were involved and a large percentage of the chicks were affected, one had every reason to believe that it had assumed epizootic proportions. Although it was found that the condition spread with alarming rapidity among the baby chicks on a certain premise, we have practically no evidence that the disease extended readily from an infection focus to neighboring broods.

During our field surveys and laboratory investigations, at least 25,000 affected and dead chicks came under our observation. One representative of a poultry supply house informed us that it was estimated that the disease had assumed the proportions of 1,000 sick chicks per square mile in some southern Minnesota counties.

Tens of thousands of chicks were lost in our own territory. Locally it developed into quite an economic problem. While the poultry-owners suffered heavily, the hatcherymen fared worse. To them it was not only the immediate financial loss, but more on account of what it meant in loss in faith of the public in the way of future business.

ETIOLOGY

The condition under discussion was an acute infectious and highly contagious disease of baby chicks from two days to three weeks of age, of which an overwhelming majority of them manifested first symptoms five to nine days after coming off hatch.

Our first thought was, that it perhaps was "just one more manifestation of pullorum disease." However, carefully conducted bacteriological studies to that end proved the contrary. It is true that pullorum disease was a complicating factor in certain lots of chicks we had under investigation. But, on the other hand, we met with several broods of affected chicks in which *Salmonella pullorum* was not present. The pullorum factor was to be expected in promiscuous chicks, the most of which were from untested hens.

Secondly, judging from symptoms alone, one could easily mistake the disease for typical laryngotracheitis as we see the classical disease in older fowls. It required only a few autopsies to dispel that idea entirely.

We conducted a rather careful and extensive field survey in connection with this disease. After visiting several hatcheries and hatchery farms where the overflow baby chicks are sent, one possibility suggested itself very strongly. In practically all of these hatcheries they were practicing incubator disinfection when the hatch was coming off, using formaldehyde and potassium permanganate in the proportions usually prescribed.

After inhaling the fumes of this disinfectant mixture for brief periods of one or two minutes in a half-dozen incubators, in the course of one day, and developing an acute case of coryza, one would naturally wonder just what might happen to the delicate baby chicks when exposed to these same fumes continually for one hour, as is ordinarily recommended.

Such experience would at once suggest the probability of the strong fumes acting as predisposing factors, devitalizing the respiratory mucosa, and lowering resistance to a point where residual or invading bacteria of a non-specific nature may play the major role as etiological agents.

However, the disinfectant fumes were not involved in all instances. We encountered typical cases of this gasping disease on farms where chicks were hatched and brooded by hens. To our knowledge, this was found only on two premises where but few chicks were affected, and confined to a single brood in each case.

BACTERIOLOGICAL STUDIES AND EXPERIMENTAL EXPOSURES

It is regrettable that time afforded for these investigations was too limited to work over certain phases of the disease in a satisfactory manner. Suitable material was available for only

about seven weeks. Another very unfortunate condition prevailed which materially impeded our progress. In the midst of our first inoculation experiments with bacterial cultures, and exudates and extracts and their filtrates, it was learned that our control chicks were coming down with the disease with approximately the same regularity as the exposed chicks. This occurred in spite of the usual precautions practiced to avoid such catastrophes. Such a turn of affairs indicated that we were dealing with an unusually highly contagious disease, in fact, so readily transmissible that control chicks could not be carried in the same building. Of course, this reversal proved quite costly in consuming valuable time and the subsequent bacterial studies, supported by proper exposure experiments, with adequate, reliable controls, were insufficient for definite conclusions.

Experimental inoculations with filtrates from respiratory tissue exudates and extracts of the diseased chicks were carried out with both baby chicks and adult fowls. While these results are also inconclusive, we believe they are indicative and suggestive.

A. EXPOSURE OF BABY CHICKS TO BERKEFELD FILTRATES

May 7, 1930, fourteen five-day-old chicks were inoculated intratracheally or intraabdominally with standard Berkefeld filtrates. Five chicks of the same lot were set aside in the farthest corner of the same building as controls. Of the exposed chicks, ten died, six of them before gasping symptoms appeared and four afterwards. Two of the five controls died also. Practically all dead chicks, both exposed and controls, presented the usual congested lungs and other constant lesions at autopsy. Two of the exposed chicks also had bacillary white diarrhea as a complication.

On May 15, 1930, another lot of 25 three-day-old chicks were exposed to material which had been passed through a standard Berkefeld filter. Seventeen received 0.5 cc of filtrate subcutaneously or intraabdominally. Within five days nine had died, eight of which revealed various degrees of congestion of the lungs. The remaining eight were swabbed, via the larynx and trachea, with the filtrate, of which one died showing acute congestion of the lungs. None of the sick chicks in this experiment gasped, but all manifested the other common symptoms and showed the typical lesions at autopsy. The controls held satisfactorily, in

this experiment, which was conducted in a separate, isolated building, with a different caretaker in charge.

B. EXPOSURE OF ADULT FOWLS TO BERKEFELD FILTRATES

On May 7, 13, 25 and 28, 1930, 25 adult hens were inoculated with respiratory tissue exudates and extracts intraabdominally, subcutaneously, intramuscularly, intratracheally, or by nasal and laryngeal swab applications. The majority of these fowls were inoculated with a Berkefeld filtrate and the remainder with fresh unfiltered material. In the filtrate group, two developed mild respiratory disturbances, from which they apparently completely recovered within four or five days. A third bird died in which no respiratory symptoms were observed.

Of the fowls treated with the unfiltered suspensions, one developed a mild dyspnea with a gentle rattling respiratory noise, which also recovered in the course of a few days. Another hen died of peritonitis. No respiratory symptoms were noted in this bird.

SUSCEPTIBILITY—FOWLS AFFECTED

Our observations would indicate that this disease (in our section of the country) is almost exclusively confined to baby chicks, from two days to about three weeks of age, and a preponderating majority of the chicks exhibit first symptoms of the disease between the fifth and ninth days after coming off hatch.

In not a single instance did we see the symptoms of this condition develop in birds over that age. Further, we were consistently unable to reproduce the disease experimentally in older chicks by the greatest possible intense exposure by continuous cohabitation with large numbers of sick chicks in various stages of the disease. On a nearby hatchery farm, where they kept from two to six thousand chicks, we had a most excellent opportunity to follow the course of the disease. We personally visited this premise from three to five times a week, and thereby obtained some very valuable information regarding its course, progress and developments from time to time. Proper hygienic and sanitary conditions were lacking in this brooder-house. Every four or five days a new lot of noticeably sick chicks or those in the incubation stage of the disease were delivered at the farm. There was more or less mingling of all the birds and conditions were simply ideal for exposure. Throughout the six-week observation period on this farm, it was clearly seen, that if the chicks

escaped the disease the first three weeks of post-natal life, they invariably remained free from it.

Of the scores of farms suffering the ravages of this disease in baby chicks, only two reported respiratory disturbances in the older fowls. In both cases, the condition was relatively mild in nature and only two birds were lost. It may be mentioned incidentally at this time, that our laboratory records from March 1 to June 1, 1930, show only seven cases of laryngotracheitis, or infectious bronchitis of acute or subacute type as described by Doyle,¹ Graham *et al.*,² and others. These figures are quoted to contrast the well-established disease in older fowls, with the widespread, raging, new disease in chicks.

No cases of this disease have been observed in turkeys. Twenty-four two-day-old turkey poults were quartered in a brooder-house with large number of baby chicks in varying stages of the disease. The turkey poults cohabited continuously with the diseased chicks for more than four weeks without exhibiting any evidence whatever of this conditions.

SYMPTOMATOLOGY

As previously stated, it is primarily a respiratory disease. Consequently the more potent symptoms would naturally be manifestations of physiologic disturbances of that apparatus. The laymen, particularly the hatcherymen and poultry-raisers, commonly refer to it as a gasping disease. It is true that gasping is the most noticeable and spectacular symptom, the one that would appeal most to the layman, but it is not necessarily the first evidence shown. We have learned also that gasping is not always present, as many sick chicks die without manifesting this phenomenon.

As early as two days after the chicks come off hatch, which means from 72 to 96 hours after the chicks pick the shell, they may be seen showing signs of listlessness and depression. At first this may be only periodic, after which they seem to liven up and drink and pick at feed. Typical gasping, quite similar to that seen in gasping chicks, may be present at this age. However, as a rule, most gasping is observed between the fifth and ninth days. In all probability the gasping phase is largely governed by the degree of infection and the age at which the disease is contracted.

Most chicks appear to contract the disease between the fifth and ninth days, although we have encountered it in its incipient

stages in birds fifteen to eighteen days old. The severity of the disease is apparently lessened in the older attacked poults, as a larger percentage of the nine- to fifteen-day-old chicks recover.

As the disease advances in the more pronounced fatal cases, the wings begin to sag, the feathers become coarse and ruffled, they grow progressively weaker, huddle up under the hover, close the eyes, retract the head closely to the body and assume a crouched position as if in a state of sleep. In the bird that gasps, it will be seen periodically awakening from its slumbers, stretching the head upward and forward, gasping for air. At certain stages of the disease, many of the chicks emit a rather coarse, characteristic chirp, which will be readily distinguished from the normal chirp. At times, several poults may be heard chirping in unison, in a sort of plaintive chorus. If one should visit a large brooder at night, where many birds are affected, there is usually heard a sonorous sound, mingled with gentle râles and low rattling jingles, much resembling the noises coming from a roost of older birds affected with laryngotracheitis. As the final stages are approached, the wings drop almost to the floor, and the physical appearance of the chick becomes a pitiable sight. Emaciation ensues and the chick dies from starvation and sheer exhaustion.

PATHOLOGY—AUTOPSY FINDINGS

Judging from the symptoms just noted, one might expect the autopsy to reveal a gross pathology quite similar to that commonly seen in laryngotracheitis of adult fowls. But here is where the picture materially differs. In typical laryngotracheitis of older birds, the principal and most distinguishing pathologic lesions are constantly found in the anterior or upper tracheal region and the larynx, hence the name laryngotracheitis. The lesions usually present themselves in the form of croupous, fibrinous membranes that adhere to the upper trachea and larynx, or caseous or hemorrhagic plugs that partially or completely occlude the lumina of these organs.

In conducting approximately 150 autopsies on chicks dead from this disease, we found the characteristic laryngotracheitis lesions but twice. In those cases they were small, caseo-fibrinous accumulations in the anterior trachea. In all the remaining chicks those distinctive morbid changes were entirely absent.

The most constant and characteristic lesions encountered in the baby-chick disease were found in the lungs and bronchi. Invariably the lungs were found in a marked state of acute con-

gestion. Usually the congestion was spread rather uniformly through both lobes, but occasionally it was confined to only one branch of this organ. Accompanying this state of congestion the bronchioles and bronchi were partially or entirely filled with a sero-mucoid liquid exudate. With the chest cavity opened and the lungs left *in situ*, gentle pressure exerted with the thumb upon both lobes would cause the liquid exudate to well up into the trachea, giving evidence of the large volume of liquid present. Sometimes the serous exudate would be found throughout the lung tissue also, setting up an edematous condition of that organ.

In some cases of long standing, small, caseous, pneumonic areas could be seen scattered throughout the lungs. These foci should not be confused with lesions of pullorum disease. However, bacteriological studies will readily make the proper differentiations.

We found also, in numerous autopsies, that some pathological changes were present in the upper respiratory organs, principally the nasal passages, the turbinated bones and the sinuses. They were by no means of constant occurrence, but were sufficiently common to warrant their mention and consideration.

The mucosae of these structures were coated with a heavy mucoid exudate that at times appeared to be mixed with purulent material. When the head was cross-sectioned, just anterior to the eyes, and pressure exerted upon the remaining portion, the muco-purulent material exuded from the various cavities in voluminous beads. Also in some instances a white, mealy, caseous material was found loosely collected around the palatine cleft and in various places in the posterior nasal passages. The mucosae in these cases were usually much darker in color than normal, evidently the result of venous congestion. We do not know what significance, if any, may be attached to these changes in connection with the disease under investigation.

COURSE—PROGNOSIS—MORTALITY

As the disease occurred in our section of the country, it would be classed chiefly as an acute condition. Those chicks that began gasping within two or three days after they came off the incubator trays were really peracute in nature. The onset was early and sudden and the course rapid and fatal.

The prevailing acute type usually attacked between the fifth and ninth days. Its course ranged from three to five or six days. Toward the latter part of the outbreak the virulence or degree and intensity of the disease appeared to subside partially and the

condition often assumed a subacute or, in some cases, a chronic nature, when the disease became materially milder and the mortality rate much lower.

The losses varied somewhat in accordance with governing conditions. Field surveys revealed considerable evidence that hygienic factors, both as to the number of birds that became affected, and the actual losses sustained. The sick chicks ranged from 25 to about 75 per cent of the poults in an infected brooder, over the three-week susceptible period.

Of the diseased birds, the mortality was found to be from about 40 to 90 per cent and sometimes more. In brooders that were without ventilation or overheated, or more often those maintained under widely fluctuating temperatures, and greatly overcrowded, were usually the places wherein the higher percentages of both infection and mortality prevailed.

TREATMENT AND PREVENTIVE MEASURES

A condition of such magnitude, involving tremendous losses, certainly warranted earnest and conscientious endeavors toward developing preventive and control measures. From the very nature of the disease and the delicate state and age of the chicks, the most plausible line of therapeutic intervention appeared to be with medicinal inhalations.

Our first attempts were made chiefly with older chicks that were gasping and quite noticeably sick. We selected a number of the recognized volatile medicinal agents, that have found popular usage in both human and veterinary medicine. The list included menthol, camphor, oil of eucalyptus, oil of pine needles and guaiacol. Various combinations of these drugs were applied in the form of fine mist sprays directly upon the birds, confined closely in a corner of the brooder or volatilized in some manner so that the vaporous fumes thoroughly permeated the entire brooder or brooder-house compartments quartering the poults.

This treatment was unusually successful upon the client and apparently lessened the aggravated respiratory conditions in the birds. It was quite noticeable that the plaintive chirp referred to under symptoms was changed in tone. But it was gravely doubtful in our minds, if much or any substantial improvement of a permanent nature was obtained.

However, we do have evidence from our later controlled experimental trials, that early systematic treatment of the chicks just

off hatch will prevent the condition from developing in a large measure and the cases that do occur appear to be mild in nature.

Briefly, our recommended plan of preventive treatment is as follows. Use equal parts of menthol, oil of eucalyptus and guaiacol. Take about a teaspoonful of this mixture and place it in about a pint of boiling water in a small receptacle under the brooder-hover or other closed device where the chicks can be confined. Expose the poult to the vaporous fumes in this manner for about ten-minute periods, three times a day, for several days. It is well to observe the chicks two or three times during an exposure, according to the degree of closeness and confinement, to note if there is any indication of suffocation or other untoward effects. We might say that we did not observe any evidences to that effect.

STRESS EFFICIENT HYGIENIC PRACTICES

Supplementing the medical preventive treatment, we believe it becomes incumbent upon all veterinarians who are called for assistance in this disease, to outline and see that the necessary hygienic measures are put in force.

The brooder-room or house should be kept as clean as possible. This can perhaps be accomplished best by placing papers upon the floor, which can be removed and burned each day and replaced by new, clean ones. In practically all brooders visited by us in our field work, we found the temperature from ten to fifteen degrees higher than is ordinarily recommended. In more than eighty per cent of the brooder-houses no artificial ventilation was practiced. This combination renders the air hot, foul and stuffy, which has a depressing effect on all kinds of live stock. Plenty of fresh air, free from drafts, is considered a standard requisite for the successful management of practically all respiratory disturbances, and it certainly applies with beneficial results in this disease.

We have refrained from specifically naming the disease under discussion. It materially differs, in one phase or another, from any of the established respiratory diseases of poultry. On the other hand, it has some characteristics of catarrhal roup, laryngotracheitis, and perhaps more things in common with infectious bronchitis of adult fowls. Therefore, if we were pressed for a definite name we would be inclined to entitle it: infectious bronchitis of baby chicks.

REFERENCES

¹Doyle, T. M.: *Jour. Comp. Path. & Therap.*, xlv (1927), p. 144.

²Graham, Robert, Thorp, Frank Jr., and James, W. A.: *Jour. Inf. Dis.*, xlvii (1930), p. 83.

PRESIDENT WIGHT: This is a very valuable paper. The next one is on "Fowl Paralysis and the 'Roup Complex,'" by Dr. H. J. Stafseth, Associate Professor of Bacteriology at Michigan State College. (Applause)

Dr. Stafseth read his paper.

FOWL PARALYSIS AND THE "ROUP COMPLEX"

By H. J. STAFSETH, *East Lansing, Mich.*

Michigan State College

Dr. Schalk assigned to me the task of presenting before this Association a fifteen-minute summary of the present knowledge concerning fowl paralysis and, as he calls it, the "roup complex."

FOWL PARALYSIS

The name fowl paralysis implies a disease entity due perhaps to one cause, while the term "roup complex" suggests a syndrome, back of which may lie several causes. It is the writer's opinion that we are confronted just as much, if not more so, with a complex when dealing with paralysis as when we are concerned with what is commonly known as roup.

A number of investigators have come to look upon so-called fowl paralysis or range paralysis as a specific disease, the cause of which is as yet unknown although thought by many to be a filtrable virus.

Symptoms: This disease is characterized clinically by progressive paralysis of one or both wings, one or both legs, sometimes torticollis, and occasionally blindness (iritis). The extensor muscles of the toes are paralyzed. Therefore, the toes are turned back under the foot fairly soon after the onset of the disease. Recovery seldom takes place.

Gross lesions: There may be enlargements of the spinal ganglia, spinal cord, or peripheral nerves. Lymphomatous masses resembling neoplasms may be found in the ovary, liver, kidney and intestines.

Microscopic lesions: Lymphoid cell infiltration may be found in the brain, spinal cord, spinal ganglia, or peripheral nerves as well as in various visceral organs such as the heart, liver, kidneys and ovary. The infiltration areas are most often perivascular.

The findings and some of the conclusions drawn concerning the nature of fowl paralysis are not entirely convincing. Time will permit the discussion of only a few factors involved.

1. *The cause:* Some of those who adhere to the belief that one specific cause, perhaps a filtrable virus, is responsible for this disease apparently disregard tapeworms, coccidia and

bacteria when considering the etiology of paralysis. On the other hand, a number of poultry pathologists believe that leg-weakness or paralysis may occur as a symptom of duodenal coccidiosis, tapeworm infestation, chronic fowl cholera, and paratyphoid infections. According to Kaupp and Dearstyne, infectious purulent proventriculitis is characterized by symptoms of paralysis, and it is a known fact that vitamin-B deficiency results in leg-weakness or paralysis. Lameness is observed also in tuberculosis.

2. *Mode of spread:* The mode of spread is unknown. Doyle believes that the disease is transmitted through the egg. While this may be so, it is rather difficult to accept this theory, in view of the fact that several flocks, within my knowledge, in which four to five years ago heavy losses were experienced due to paralysis, are now free from the disease and have been practically free for at least three years. No change in stock has been made in any of these flocks. Attempts at transmitting this disease by way of the mouth invariably have failed. Pappenheimer is the only investigator in America who has been able to transmit the disease by artificial inoculation. He was successful by means of subdural and intramuscular injections in not over twenty-five per cent of the birds used. Seifreid informed me (personal communication) that in Germany there occurs a form of paralysis which is rather easily transmitted by artificial inoculation. In view of the radical methods of inoculation used and the low incidence of infection obtained by Pappenheimer, it is rather difficult to account for the heavy losses experienced from this disease as it occurs naturally.

3. *Symptoms:* When Pappenheimer and others state that no relation exists between worm infestation and paralysis or between coccidiosis and paralysis, they undoubtedly refer to a certain type of paralysis distinguishable clinically or otherwise from other forms of paralysis. The incubation period of fowl paralysis or neurolymphomatosis, as Pappenheimer calls this disease, is, according to him, at least two months and usually three to eighteen months, yet paralysis symptomatically indistinguishable from neurolymphomatosis has been observed in considerable numbers of five- to six-week-old chicks suffering from duodenal coccidiosis.

The suggestion has been made that what appears to be paralysis in such cases may be nothing but general weakness. This does not seem like an adequate explanation, since the chicks were

invariably alert and bright and ate and drank eagerly when allowed to do so. The inability to use their legs seemed to be their only trouble. Furthermore, in material studied over a period of three years, seventy per cent of the birds affected with duodenal coccidiosis showed leg-weakness or paralysis, while only about four per cent of the birds affected with cecal coccidiosis showed such symptoms.

In Louisiana, Morris found that 70 per cent of the birds affected with blindness were infected with coccidia, 55 per cent of them had tapeworms, 50 per cent round worms, and 20 per cent capillaria sp. He does not feel that there is any relation between paralysis and blindness as it exists in his state.

Whether coccidia and tapeworms are direct causes of leg-weakness or paralysis, or whether they are mere predisposing factors is difficult to say, but it does seem that they are responsible for a good share of this ailment. It is not improbable that they may aid virus infection by the destruction of the mucous membrane epithelium.

4. *Lesions:* The lymphoid infiltration of nerve and other tissue is considered by some investigators to be one of the most characteristic features of fowl paralysis and as an almost positive proof of the theory that this disease is caused by a virus. Yet, Pappenheimer is puzzled by "the frequent occurrence of lymphoid infiltrations in the nervous tissues of chickens which are not paralyzed, and which betray no clinical evidence of disease." In this connection it is well to mention that chickens have no well-defined lymph-nodes. The lymph tissue is diffuse and, according to Kitt, is easily subject to proliferation. The stimulus to such a proliferation and infiltration might conceivably be furnished by more than one agent.

Thus it seems quite evident that further study is needed to determine:

- (1) The actual cause or causes of paralysis;
- (2) The relationship of coccidia and tapeworms to leg-weakness and paralysis;
- (3) The possibility of transmission of a virus through the egg;
- (4) Whether or not there may be an inherited predisposition; and
- (5) The true significance of lymphoid or undifferentiated mesenchymal cell infiltration of nerve and other tissues so commonly seen in diseased as well as apparently healthy chickens.

THE "ROUP COMPLEX"

The disease commonly known as roup is a catarrhal inflammation of the membranes of the upper air-passages, in other words a typical coryza.

Cause and mode of transmission: While the cause of roup is not known, the disease has all the characteristics of a contagious disease. In making isolations from the inflamed tissues or the discharge, one may find a considerable variety of organisms, such as: *Escherichia coli*, *Pseudomonas aeruginosa*, *Pasteurella avicida*, diphtheroids, staphylococci, streptococci, and some workers believe that they have been able to demonstrate the presence of a filtrable virus capable of causing typical attacks of roup in artificially inoculated birds.

Although the disease seems to spread with great rapidity within certain flocks, it has proved very difficult to transmit the contagium artificially with any degree of regularity. Thus one may be inclined to believe that the cause of roup is polymicrobial. It seems possible that the presence of a certain combination of microbes might be necessary for the production of this disease or that some predisposing influences would so reduce the natural resistance of the birds as to enable organisms, normally present on the membranes of the upper air-passages, to produce a catarrhal inflammation. Observations at the Michigan Station have led us to the belief that worm infestation is a particularly marked factor in disturbing the normal balance which sometimes exists between the defensive forces of the host and the offensive forces of microbes. Improper housing, faulty feeding, and various chronic infectious diseases such as tuberculosis, coccidiosis, yes, even pullorum disease, might be considered as possible predisposing causes.

Symptoms and lesions: One of the earliest manifestations of this disease is frequent sneezing and shaking of the head. Then one will notice a watery discharge from the nostrils. The discharge soon becomes sticky, closing the nasal openings, thus causing an accumulation of muco-purulent material in one or both of the infraorbital sinuses. This accumulation in the sinuses, in time, causes a bulging just below and, at times, just in front of one or both eyes. Sometimes this bulging is sufficient to force the eyelids upward until the eye is closed. An examination of the eye will usually show that the conjunctival mem-

branes are not involved. However, once in a while a slight inflammation with more or less discharge will be found.

If typical eye cankers develop (a condition commonly spoken of as ocular roup), there is reason to believe that the case is complicated by the presence of fowl-pox virus. There is usually some mucous or mucopurulent discharge from the palatine cleft, and dirty, grayish, soft, membranous masses may be found adhering lightly to the roof of the mouth and the pharyngeal mucosa. Those membranous masses differ from the cankers or psuedomembranes which are seen in the internal or diphtheritic form of fowl-pox. The membranous masses associated with roup are easily removed without marked injury to the underlying mucosa, while the yellowish and firm pox cankers adhere so closely to the mucous membrane that a raw surface is left when they are removed, except in the later stages of pox, when they may peel naturally. The mucous membranes of the mouth and pharynx are dark and congested. Occasionally the membrana nictitans, the tissues around one or both eyes and one or both wattles, may be swollen. On opening the infraorbital sinuses one will find mucous or muco-purulent discharge or even cheesy masses representing dried pus. A very offensive odor is associated with roup, but such an odor also accompanies diphtheritic pox. In some outbreaks the birds appear droopy and listless from the start; in others they may remain quite alert and active. If the attack is prolonged, emaciation will usually result. The disease may last from two to five weeks with a mortality varying from none to ninety per cent of the birds affected.

Diagnosis: In attempting to establish a diagnosis of roup, one must be able to eliminate fowl-pox and laryngotracheitis. The symptoms of roup have just been described. Fowl-pox is characterized by the formation of scabs (epitheliomas) on the skin, especially of the comb, wattles and head, cankerous masses in the conjunctival sac and cankers or diphtheritic membranes on the tongue, on various parts of the mucous membrane of the mouth, and in the larynx or upper part of the trachea. As has already been stated these cankers are yellowish, fairly firm in consistency, and adhere tightly to the mucous membranes in the earlier stages of the disease. An exception is found in the case of the eye canker which is more easily removed in the early stages of pox than later, when it will be found to adhere to the eyeball, causing necrosis and often loss of the eye.

In laryngotracheitis we find no disagreeable odor such as that accompanying roup and pox. There are, furthermore, no lesions outside of the larynx, trachea or bronchi.

Treatment. No specific medicinal treatment is known. If the birds are found to be infested with worms, the administration of an effective vermifuge or preferably a vermicide will usually hasten recovery. Such a remedy must be without toxic effect on the birds, or one may make things worse rather than better. Should the affected birds be very valuable and few in number, individual treatment by means of mild antiseptics or soothing remedies may be undertaken. However, experience has taught us that one cannot expect very much from such treatments, especially when confronted with a severe outbreak. The various sprays and fumigants sold as remedies for roup are of questionable value.

Prevention: In mild outbreaks, isolation of diseased birds, cleaning and disinfection may prove adequate in preventing or checking the spread of the disease. However, more severe outbreaks usually do not yield readily to such preventive measures. The placing of suitable antiseptics in the drinking water is thought advisable. Good feeding and keeping the birds as free from parasites as possible should be of first consideration.

The use of bacterins is thought useful by some workers and worthless by others. Recently Elder and his associates of the Wyoming Station published a bulletin in which they report entirely indifferent results from the use of bacterins in the treatment and prevention of roup. However, since it is possible that roup may not always be caused by the same organism or combination of organisms, one would naturally expect variable results from attempted immunization. Elder evidently did not isolate nor identify the organisms out of which he prepared his bacterin. He killed the organisms by means of heat, thus very likely reducing their antigenicity, and furthermore used excessive dosage. In considering his failure with commercial bacterins, it must be remembered that such products are usually made up of six or seven organisms, namely: *Escherichia coli*, *Pasteurella avicida*, *Salmonella gallinarum*, *Pseudomonas aeruginosa*, streptococci and staphylococci. It does not take much knowledge of immunology to see that it seems rather fanciful to expect that a bird should become immune to all these organisms at the same time.

Field observations made in various parts of the United States have lent encouragement to the further use of bacterins in the treatment and control of roup. These observations are supported by a checked experiment carried out this fall in a flock of 1,000 chickens, located near Grand Rapids, Michigan. Early this fall a rather severe attack of roup broke out in this flock. The birds were housed in five pens, and all pens seemed to be affected about equally. On our recommendation, three of these pens were vaccinated and two were left as controls. Pen 1 was treated one day, pen 2 the next day, and so forth. One cc was given to each bird, the treatment being repeated five days after the first injection. Very badly affected birds were given four injections. The results were as follows:

The roup odor disappeared from the treated pens in five days. In the treated pens recovery took place in the order in which the treatment was applied. Thus the pen that was treated first recovered first, and so on. The birds came back into production practically in the same order. The check pens recovered much more slowly and remained out of production and in poor condition several weeks after the others had returned to normal health. It will be admitted that one experiment of this sort offers no absolute proof of the value of bacterins in the control of roup, but it leaves us with the feeling that vaccination is worthy of further trials.

If we are to combat roup intelligently and successfully, we must have more information concerning:

- (1) Its etiology, *i. e.*, the actual cause and the role played by various possible predisposing factors;
- (2) The value of medicinal agents used in flock or individual treatment; and
- (3) Immunizing agents, *i. e.*, organisms to be used, methods of attenuation or killing of the organisms, and the most effective dosage, in other words, how many organisms to inject, how many injections to be given, and how long intervals to allow between injections.

PRESIDENT WIGHT: Next is a paper on "Pullorum Disease," by Dr. Hubert Bunyea, of the Pathological Division, Bureau of Animal Industry. (Applause)

DR. HUBERT BUNYEA: I would like to say in preface that having received the impression from Dr. Schalk that this paper was to constitute a part of the report of the Committee on Transmissible Diseases of Poultry, I have taken the liberty of incorporating what I thought to be appropriate recommendations along this specific line. These recommendations will be read at the conclusion of the paper.

. . . Dr. Bunyea then read his paper. . . .

PULLORUM DISEASE

By HUBERT BUNYEA, Washington, D. C.

Pathological Division, U. S. Bureau of Animal Industry

Pullorum disease of hens is a latent affection which is usually confined to the ovary, and is brought about by the organism *Salmonella pullorum*. From an economic viewpoint the disease is of importance because of its destructive influence on the productivity of the hen and the livability of her offspring. From the sanitary viewpoint as well as the economic, it is of importance because of the fact that the infection in the ovary is transmitted to a percentage of the eggs laid by the infected hen, and consequently to the chicks hatched from these eggs. The rate of mortality among such chicks is at times enormous, to say nothing of the additional losses due to the transmission of the infection from the sick chicks to healthy ones. The chicks from the infected eggs may die in the shell, or within a short time after hatching. There may be some diseased chicks which survive only for two or three weeks, while others may live to maturity, and repeat the cycle of infection by harboring the organism, *S. pullorum*, in their ovaries, and thereby infecting their eggs and chicks.

Because of its insidious mode of transmission, pullorum disease is not altogether amenable to ordinary methods of hygiene, although these may be employed to aid in preventing dissemination of the disease among chicks. There is no known drug or combination of drugs that will prevent or cure pullorum disease in hens or chicks. Under any circumstances the medicinal treatment of this disease would not seem to be desirable from an epizootological viewpoint, since the prolongation of life among infected fowls would in all probability only add to the number of carriers of the disease, and consequently to the difficulty of its control. For this and other reasons, your Committee deplors the extensive commercial exploitation of the poultry industry by manufacturers and vendors of nostrums purporting to be effective in the remedial or preventive treatment of pullorum disease.

INCUBATORS SPREAD INFECTION

The disease has existed for many years in the United States. Its economic importance, however, has assumed increased magnitude because of the recent colossal development of the hatching

industry. It has been shown by contemporary investigators that pullorum disease is capable of spreading from infected chicks to healthy chicks in all of the various types of incubators in common use, when some of the eggs hatched are from infected hens. This is likewise true of chicks hatched under hens.

Through the mammoth hatchery, with its present high-pressure sales methods and its wide territory of distribution, this disease may be broadcast over large areas and work untold injury to the poultry industry. This places an onus of responsibility upon the hatcheryman, which he has not been slow to recognize, and concerning which there is much that he can do both to conserve the stability of his own enterprise and to enhance the best interests of the poultry industry upon which his success depends.

It is obvious, however, that the problem of controlling the disease is not primarily an incubator problem, but one of breeding hygiene, and that its solution will depend, not upon special appliances or procedures in the hatching of eggs, but rather upon the successful diagnosis of the disease in carrier hens, so that such hens may be eliminated from breeding flocks.

STANDARD AGGLUTINATION TEST DEVELOPED

The agglutination test for pullorum disease, since its adaptation to this end in 1913, has been almost universally accepted as the most satisfactory method available for the diagnosis of the infection in birds of breeding age. Like many other diagnostic tests, this one is admittedly lacking in uniformity of technic and interpretation as it is employed in various parts of the country. The Eastern States Conference of Laboratory Workers in Pullorum Disease Control, which, since its institution three years ago, has enlarged the scope of its representation, is delving very thoroughly and deliberately into the problem of developing a standardized agglutination test for pullorum disease. Your Committee regards this constructive movement among the poultry-disease specialists of the eastern section as a most commendable example which might profitably be emulated by the formation of similar sectional groups in other parts of the country. It is conceivable that the contemporary activities of several such groups might be brought to bear most effectively upon both local and general pullorum disease problems, and that these several groups might, at stated intervals, exchange notes to much mutual advantage.

With a view of reducing the cost of poultry testing to the flock-owner, and thus placing the test within the pecuniary reach of a larger sector of the industry, research workers have recently developed rapid agglutination test methods applicable respectively to the clear serum and to the fresh whole blood of chickens. The possibilities of these methods in the hands of veterinary practitioners or extension veterinarians from the experiment stations have not yet been adequately put to the test.

The intradermic or pullorin test, a radical departure from laboratory diagnostic methods, is regarded by some scientific workers as possessing promise in the field of pullorum disease control. This test consists in the injection into the wattle of a substance known as pullorin, which is said to produce in infected fowls an allergic reaction similar to the swelling caused in tuberculous fowls by the injection of avian tuberculin.

Your Committee, however, believes that the perfecting of diagnostic tests for pullorum disease constitutes but one of the major problems involved. It is self-evident that the most efficient diagnostic tests are of no avail unless followed up in a conscientious manner by the disposal of reactors and the application of sanitary measures.

DISEASE TRANSMITTED IN MANY WAYS

The proper pursuit of these follow-up measures requires, firstly, that the poultryman be convinced of their paramount importance, and secondly, that he be instructed and, where possible, assisted in the details of their performance. Science is coming to believe that pullorum disease may be transmissible to a more serious extent than formerly recognized, among adult hens, possibly by means of ordinary contact, possibly through ingestion of food or water contaminated by infected fecal matter, possibly by eating broken eggs or soft-shell eggs from infected hens, or possibly through the activity of male birds as mechanical carriers of the infection from diseased to healthy hens. The possibility that pullorum infection may remain alive on contaminated ground or in contaminated houses over long periods of time raises the question of whether science may not have been recreant to the poultryman in failing to emphasize the necessity of thorough disinfection of his premises following the removal of the reactors from his flock.

Live stock sanitary officials, veterinary practitioners and regulatory field men may have an important part in this program

of education and action. Although some veterinarians have appeared to ignore the poultry aspect of their practice, because it was not immediately profitable in a financial way, it is not to be believed that the profession as a whole would be limited by so sordid an ideal. Other veterinarians, more particularly those of the older school, plead a lack of professional knowledge of poultry diseases. It is urgent that the profession forego the consideration of immediate adequate material rewards, and accept as a real opportunity the fortuitous chain of circumstances which thrusts before their attention the needs and problems of a great and growing industry. If today the veterinarian befriend the poultry industry, in due course of events the industry will handsomely requite the obligation. To equip himself for this challenge the veterinarian who has not already done so should take full advantage of the special poultry courses announced by the veterinary colleges from time to time. He should become a zealous student of the rich store of research and reference literature extant on the subject. He should also become a keen and interested observer of all disease phenomena occurring in the poultry flocks within the realm of his practice.

There was never a greater need, nor a greater opportunity than the present for those who possess the best scientific information available on the subject of poultry disease control to impart this information to those who need it. That the industry is eagerly receptive to such expert advice on the subject is amply attested by those who have tried the experiment.

RECOMMENDATIONS

In summarizing this report, your Committee desires to make the following special recommendations:

(1) That the various state laboratories or other functioning agencies be and are hereby urged to extend their facilities to the widest possible application of the available diagnostic test methods for the detection and control of pullorum disease.

(2) That such agencies use their influence to have poultrymen adhere to the practice of prompt disposal of reactors and thorough disinfection of premises following the application of tests for pullorum disease.

(3) That veterinarians and state live stock sanitary officials be and are hereby urged to educate poultrymen and hatcherymen by securing their attendance at and addressing them in public gatherings, by supplying them with suitable printed information

in the form of popular bulletins, public notices, and so forth, dealing with the control of pullorum disease, and by visiting their poultry plants and giving such verbal advice as the circumstances seem to warrant, warning them of the necessity of obtaining baby chicks and eggs for hatching from reputable sources, also of the danger in introducing untested fowls (male or female) into their breeding flocks, and instructing them in the effective disinfection of premises which have been infected by pullorum-diseased stock.

(4) That this body favor the institution of three or more judiciously located annual sectional conferences of workers in pullorum disease control, similar to that known as the Eastern States Conference of Laboratory Workers in Pullorum Disease Control, for the purpose of coördinating and standardizing, as far as possible, the laboratory and regulatory practices in the diagnoses and control of this disease, with the further tentative proposal of a triennial national conference of workers in pullorum disease control, at which all sectional organizations shall come together for a mutual interchange of findings.

PRESIDENT WIGHT: The next will be a discussion of the subject "Fowl Leucemia," by Dr. E. L. Stubbs, of the University of Pennsylvania. (Applause)

DR. STUBBS: I, also, would like to say that Dr. Schalk asked me to prepare a statement for the Committee report on leucemia. When I found that the subject was to appear on the program, I had to alter the statement a little. I have attempted to give you a little history by way of introduction, and a short summary of some of the experimental work and the results of a very limited experiment which we conducted.

. . . Dr. Stubbs then read his paper. . . .

FOWL LEUCEMIA

By E. L. STUBBS, Philadelphia, Pa.

School of Veterinary Medicine, University of Pennsylvania,

Fowl leucemia is a term that has been used for a long time in connection with fowl diseases. It has been used mostly in a very loose manner and has been used at times apparently to indicate several different conditions. Fowl leucemia, as perhaps most often used, names a condition in fowls that on postmortem examination is characterized by an enlargement of the liver, the spleen and sometimes the kidneys and other tissues. Routine post-mortem examinations reveal an increasing number of fowls that show an enlarged liver and spleen, and this condition is becoming more and more important to those interested in poultry diseases. Such cases are not sufficiently described to say whether it is or is not true leucemia. We believe that most of these cases are not

true leucemia. Such conditions are found in fowls that have died suddenly, as well as in fowls that have been ailing for several days. Where symptoms are shown, the comb and wattles become pale. There may be a diarrhea. The appetite is poor, there is listlessness, dullness, weakness and a progressive emaciation. The blood is thin, pale red, and fails to clot readily.

Cases usually terminate in a few days. Postmortem examination shows the carcass pale, and on opening the abdominal cavity, the liver is found enlarged, sometimes greatly enlarged. Rupture of the liver with internal hemorrhage has been observed. The liver may be reddened and soft, or it may be pale and quite firm. Sometimes localized, pale, nodular areas may be found. The spleen may be enlarged, much congested, slightly congested or quite pale. The kidneys may be enlarged and pale. The intestine usually appears pale on the serous surface, but may show considerable congestion on the mucous membrane, especially in the duodenum.

Unfortunately most of these cases are unaccompanied by blood examinations or microscopic examinations. Diagnosis usually is made from postmortem examination with anemia, enlarged liver, enlarged spleen and the absence of organisms in these tissues. Our observations indicate that these cases are not true leucemia. Microscopic examination of some cases show the liver, spleen and kidneys engorged with cells that are of the round-cell type. These cells are found filling the smaller capillaries and occupying a perivascular position. This condition is most probably not leucemia but an aleucemic lymphoid hyperplasia or lymphoid leucosis, a term used by Ellerman and Bang in connection with leucemia. It is therefore difficult to estimate how prevalent or how important leucemia is among fowls, since the numerous references to leucemia in the literature are not accompanied by complete descriptions.

Experimental work has been done with leucemia in fowls. It has been established that true leucemia exists in fowls and that leucemia can be transmitted by blood injections from affected fowls to healthy fowls.

Ellerman and Bang,^{1,2} who were among the earliest reporters on leucemia, show that leucemia has been transmitted through six generations. According to these same investigators, leucemia of fowls can be reproduced by a filtrate obtained by passing organ extracts from an affected fowl through a Berkefeld filter and using the filtrate. Ellerman and Bang describe two types of

blood changes in fowls, one in which the erythrocyte precursors are chiefly affected, and which is designated erythroleucosis, and one in which the granular leucocytes and their precursors are chiefly affected, and which is designated myeloid leucosis. They recognize also a lymphoid infiltration of organs, without blood involvement and term this condition lymphoid leucosis.

Schmeisser³ obtained a strain of transmissible leucemia that he believed to be myelogenous leucemia, with a proportion of white to red blood cells of 1 to 1.3. He observed this condition in twenty-two cases out of an experimental series involving 105 fowls. The disease was reproduced after five to six weeks and was recognized by anemia, jaundice and blood changes of large mononuclear cells and mononuclear myelocytes with eosinophile granules.

Furth,⁴ of the Henry Phipps Institute of the University of Pennsylvania, has obtained a strain of transmissible leucemia in fowls. It produces a great increase in the white cells of the blood and similar cells in the bone-marrow, liver and spleen. Blood counts show 530,000 to 670,000 white cells per cubic millimeter of blood. Some injected birds show large numbers of mononuclears and myelocytes; others show large numbers of erythrocyte precursors in the circulating blood.

At the Veterinary School of the University of Pennsylvania, we have worked with this strain of fowl leucemia in a carefully controlled experiment with young Barred Rock chickens. Two fowls with leucemia, one having erythroleucosis and the other a myeloid leucosis, were used as donors. Blood from these two fowls was injected into normal healthy fowls. Fifty-two per cent of the injected fowls came down with leucemia. Two types of leucemia were produced, one in which the blood picture showed large numbers of erythroblasts, and the other with a large number of large mononuclears and myelocytes. The first type corresponds to the erythroleucosis of Ellerman and Bang, and the second to their myeloid leucosis. The bone-marrow in both types showed an extreme hyperplasia formed by cells similar to those found in the blood-vessels. The two types cannot be differentiated with certainty by gross appearance of the organs. The method of differentiation is by blood examination before death and the microscopic changes in the bone-marrow, liver and spleen after death.

The fowls that developed leucemia developed a distinct and noticeable paleness of the comb and wattles and did not gain

in weight in comparison with the control fowls. Gross examination showed many pale red hemorrhages in various locations, particularly over the humeral region and over the joints. The livers were all slightly enlarged. The spleens were all enlarged and by weight were from two to six times the weight of the spleens in the control fowls. The spleens averaged four times the weight of the spleens in the control chickens.

Gross examination of these fowls did not show the enormous liver that is frequently found in the disease commonly described and that is frequently called leucemia.

Thus it has been established that true leucemia exists among fowls and it can be transmitted from fowl to fowl. The subject, however, needs much further investigation.

REFERENCES

- ¹Ellerman V., and Bang, O.: Experimentelle Leukämie bei Hühnern. *Cent. f. Bakt.*, xlv, p. 1.
²Ellerman, V., and Bang, O.: Experimentelle Leukämie bei Hühnern. *Ztschr. f. Hyg. u. Infekt.*, lxxiii p. 231.
³Schmeisser, H. C.: Leukämie of the fowl, spontaneous and experimental. *Johns Hopkins Hospital Rpt.* (1915).
⁴Furth, J.: On the transmissibility of the leucemia of fowls. *Proc. Soc. Exp. Biol. & Med.*, xxvii (1929), pp. 155-157.

PRESIDENT WIGHT: The next is the report of the Committee on Avian Tuberculosis which, as I understand, was rather a special arrangement provided for last year. That is why it did not come in with the regular tuberculosis program. Dr. Schalk not being here, the report will be presented by Dr. Bunyea. (Applause)

DR. BUNYEA: Mr. President and Gentlemen: The regrettable indisposition of our beloved Chairman has put me in the position of the proverbial Scotchman who made his first visit to a doctor in his town. While he sat waiting in the waiting-room, he noticed on the wall a sign which said: "First consultation \$5; subsequent consultations \$2 each." The doctor opened the door and invited him into his office. The Scotchman held out his hand and said, "Well, Doctor, here I am again." (Laughter)

Dr. Bunyea then read a report on "Avian Tuberculosis," prepared by Dr. A. F. Schalk.

AVIAN TUBERCULOSIS

By A. F. SCHALK, Columbus, Ohio

College of Veterinary Medicine, Ohio State University

A survey of the literature readily discloses the information that avian tuberculosis, comparatively speaking, is a relatively new disease in American poultry. Its presence as a definitely known and recognized disease in our country dates back to 1900, the beginning of the present century. Its recognition as a distinct disease entity in the Old World is also of recent origin, as no authentic reference to it can be found previous to 1868, the year Villemin proved the transmissibility of mammalian tuberculosis.

However, in this brief expanse of time, very material progress has been made in bringing to light many basic facts concerning this fundamentally important transmissible disease.

The present nation-wide tuberculosis eradication campaign, which really had its inception in 1917, marks a new and very significant period in animal tuberculosis history. This campaign has afforded both the occasion and the opportunity for projecting a series of ingenious researches involving various phases of tuberculosis. Many of these special studies embody the avian type of the organism and its probable implication of animal hosts, other than fowls. To say the least, some of these investigations have proven quite fruitful of results and are of far-reaching importance, as they have a marked economic bearing upon the tuberculosis problem complex that presently confronts us.

We do not think it necessary to elaborate upon all the clinical aspects of the disease in a report of this nature. However, we do deem it highly advisable to lay especial emphasis upon some phases, particularly those that may be influential factors in formulating measures for its control and possible eradication.

First, let us take stock of the recent findings, the newer knowledge on the subject, as gleaned from the experimental studies conducted in this field during the last few years. We gather from the available data, that baby chicks are not hatched with tuberculosis from eggs from tuberculous hens; that less than one per cent of eggs from tuberculous fowls contain tuberculosis organisms; that an overwhelming majority of localized tuberculous foci in swine are the result of the avian type of the germ; that the avian organisms may remain viable and capable of reproducing the disease in healthy birds after having been harbored for two years in ordinary barnyard soil; that exceedingly small numbers of the organisms are capable of sensitizing cattle to the extent that they will react to avian tuberculosis; that pigeons, sparrows and common rats are definite mechanical carrier hosts of avian tuberculosis; and, lastly, that cattle do occasionally contract the avian type of the disease, though usually in a slight and localized form.

Another noteworthy contribution to our fund of enlightenment is the rather definite knowledge that has been obtained regarding the extent and distribution of avian tuberculosis among our domesticated fowls throughout the country. The various diagnostic laboratories, the veterinary practitioners and the many state and federal agents in their various activities afield

have learned that the disease is not universally distributed throughout the country, but is confined to certain areas and sections. This survey, though far from being complete in many respects, has brought out the intelligence that some states and sections are comparatively or entirely free from avian tuberculosis.

It is readily acknowledged that not all of the foregoing findings have an immediate practical bearing upon the control and suppression of avian tuberculosis. Nevertheless, it should be recognized that many of the above-mentioned facts constitute about the only established knowledge available at this time upon which to build sound and reliable measures for the eradication of the disease. Some of them are quite significant and fundamental and no program designed for the solution of the avian tuberculosis problem can be wisely projected and intelligently pursued without their most careful consideration and incorporation.

It is quite noticeable that general avian tuberculosis control work is exceedingly slow in getting under way. Why is it that this movement is not speeding up and taking on the proportions of a real progressive sanitary project? It would appear, from a standpoint of efficiency and economy, that this control work should go hand in hand and proceed parallel with the classical eradication work that is going forward with bovine tuberculosis in practically every state of the union.

The waiting or "do nothing" policy that is now in common vogue in many states is only momentarily evading the issue and borrowing complicated trouble for the future. I believe that this state of hesitancy on the part of many can be largely attributed to three principal conditions: First, to an underestimation or lack of comprehension of the real seriousness of the possibilities of avian tuberculosis of domesticated fowls and other animals; secondly, to a sort of inferiority complex developed in the minds of some from the apparent tremendous magnitude and complicated nature of the problem, coupled with the probable futility of combating it successfully, and lastly, and perhaps the greatest restraining factor, is the failure of many states and the federal government to provide their sanitary authorities with the necessary funds to carry on an active and systematic campaign for the suppression of the disease.

In discussing the first condition it is only necessary to call to the attention of those who are skeptical, or who underestimate the possibilities, the intrinsic value of the poultry industry and

the economic losses occasioned by this insidious disease in territories where it is prevalent. It is not at all difficult to refer to many areas wherein 50 to 90 per cent of the flocks are involved, and in which 4 to 75 or more per cent of the adult birds are infected. Careful questioning of the owners of such flocks invariably brings out the common knowledge that they lose from ten to twenty-five or more birds each year, that show exhaustion, lameness, pale combs and wattles and go light!

Additional losses also are sustained in varying percentages in infected birds that do not die but lose from 25 to 60 or more per cent of their body weight from the wasting nature of the disease. These two items, the dead fowls and the loss of flesh in the infected living birds, amounts to tremendous poultry poundage losses annually. This alone is certainly of sufficient economic importance to justify a real effort on the part of the profession to curtail and ultimately to eradicate the disease.

The second premise, that the attendant difficulties involved in the problems practically preclude all hope of successful control and eventual eradication of the disease, is neither logical nor tenable. A brief summary of some of the more encouraging facts in the case ought to show the erroneousness of this theory and dispel the skepticism of the most fastidious.

First, the recognized fact that no one has ever seen a normal newly hatched baby chick infected with tuberculosis is truly significant and fundamental in importance. Beginning at birth, with definitely known absolutely clean disease-free young is a recognized point of vantage when formulating control and eradication measures for an efficient sanitary program for any class of live stock. Baby chicks are no exception as regards this particular disease.

Secondly, we know that infection is almost exclusively confined to adult birds, which are practically continuously throwing off the infecting organisms through their droppings and contaminating not only the poultry-houses but the soils of the yards and runways upon which they are quartered or range. Then, associated with the soil factor, it has recently been shown that some of the avian organisms may remain alive and viable and capable of reproducing the disease in healthy fowls and swine after having been harbored two years in some soils.

Lastly, if we consider, with the three foregoing conditions, the probabilities of common rats, pigeons and sparrows as mechanical carriers and spreaders of the disease, I believe we have four

cardinal scientific facts which will furnish the essential equipment and foundation material for a sound, workable eradication program.

Briefly, such a policy would incorporate the idea of beginning with baby chicks, reared entirely away from the adult fowls, upon clean virgin soils, of disposing of all adult birds as yearlings in order to eliminate all infection carriers *en masse*; and of maintaining the crop of young disease-free birds in thoroughly disinfected, sanitary poultry-houses, yards and runways, managed in one of the three following ways:

First, to provide portable types of poultry-houses that can be readily moved to a place where they will be surrounded by land that has not been inhabited by adult birds for at least two years. Second, to provide the poultry-house with two or three suitable connecting yards that can be properly rotated to avoid contaminated soils. Third, and lastly, if the poultry-house is immovable and local range conditions must prevail, to spade the soils adjacent to the poultry-house very carefully and deeply and see that the top layer is turned under deeply.

If we supplement these precautionary practices with controlling the mechanical carriers, and do not bring in any adult chickens and turkeys except those that have passed a negative tuberculin test, the necessary precautions will have been complied with to control the resident infection and likewise prevent its entrance into the flock from the outside.

This brings us to the last condition, *i. e.*, the position of the state and federal regulatory authorities. At the present time the most of these agencies are placed in a rather embarrassing position, as they do not have separate funds to carry on this work as they should. Their constituents, both the poultrymen and those who provide funds for their activities, do not appreciate the losses sustained by the disease. Thus, the subject resolves itself into a matter of education. And education, I firmly believe, constitutes the very foremost and urgent need in avian tuberculosis eradication today.

The public living in areas where the avian infection prevails should be fully informed as to the possibilities and the actual economic losses that are resulting from the disease in chickens, turkeys and swine. This calls for a broad and comprehensive plan of education of those concerned, on the subject. But, who should be responsible for this educational campaign? Primarily it should be headed up by the state and federal sanitary officials,

as the educational propaganda is only a prelude to control and suppression work that will follow and which is destined to come under the supervision of these bodies.

Secondarily, every veterinary group which comes in personal contact or has correspondence with poultry-owners, either in individual contacts or in assembled groups at the various agricultural meetings, can lend a helping hand in spreading information of this nature. The veterinary practitioner can do no better extension work for future patronage for his profession than to contribute liberally to such educational campaigns. Through correspondence, the veterinarians in charge of diagnostic laboratories and those responsible for veterinary teaching in the state agricultural colleges, can also materially aid such educational movements. The latter group in particular have an unusual opportunity, as they are dealing with a clientele having young plastic minds that are quite receptive, and grasp and accept educational innovations much more readily than the older element.

Having succeeded in putting over a strong, vigorous educational campaign, in which the established facts regarding avian tuberculosis have been fully explained, the urgent need for adequate funds would be justified in the minds of practically all concerned. The state and federal officials could then approach their respective legislative bodies upon sound worthy grounds for financial requests that could hardly be denied.

In this manner I firmly believe the reaction would be favorable and the financial support forthcoming, that would enable the state and federal sanitary agents to proceed with a general avian tuberculosis eradication movement that would soon parallel the most excellent and encouraging results we are experiencing with bovine tuberculosis control work.

DISCUSSION

DR. H. D. CHAMBERLAIN: The Illinois Department of Agriculture is soliciting every aid we can possibly get from the federal government and every state in the Union. We have done some work in the State.

Our Department has been very liberal with us in diverting from our tuberculosis fund a fund for investigating avian tuberculosis. We are trying to spend that money as economically as possible.

Two years ago we had a plan by which we went into counties and did area testing. We tested all the way from 50 to 90 per cent of the flocks in the county, varying all the way from 75 to 300,000 chickens on the different farms. To some of us it was an impractical work. We didn't think we got results that we should, but we carried on the work. We spent about \$100,000. We got some valuable statistics. When we first started out to handle fowls, we handled them in the old way. We changed the different ways of handling birds, so the work is done much more rapidly. We realize that tuberculosis work is a matter of education.

At the present time we are trying to take as many counties as we possibly can. We reduced our state force to three men. We go into the county and employ the local veterinarian. We have been able to get all the way from five to sixteen men interested in the county. The University has been very kind to us. The work is conducted in conjunction with the University. They have reduced the cost of tuberculin as much as possible. We ask the county for an appropriation of not more than \$200 for tuberculin. That is all we ask of the county. We employ the local men. Our men instruct them in the technic of handling the birds, making reports, and so forth. We test all the chickens on the farm. We test the cattle and hogs wherever we possibly can. We are trying to show the relation of avian tuberculosis to the cattle and hogs.

Our experience is this: When an unknown state employee goes on the different farms, it is very difficult for him to convince the people. The local men can pick out eight, ten or fifteen flocks in each county.

We expect to carry those over a period of two years. We wish to get contracts similar to our tuberculosis contracts. They sign up the contracts, agreeing to comply with our sanitary rules. We require that they have ventilation and have the feed and water receptacles raised up from the ground so they will be clean. We require a complete clean-up.

We are using these farms as illustrations of what can be done by following a truly sanitary plan. We realize, and I think we are able to demonstrate, that if a farmer would sell his old birds every year and rely upon early-hatched chickens, he would soon be rid of the tuberculosis question.

We have farms that never had a tuberculin test. There are farms where we made postmortems and showed the existence of tuberculosis. We advised them to sell all the old birds. In going back two years later we have found those farms in splendid condition.

The point is this: Where we can interest the local veterinarian, we get much better results than we do from state work, that is by having state employees go there. Where we can interest the local veterinarian, he will get the farmer interested and show the relation of avian tuberculosis to hogs. In the counties where we have tested 55,000 chickens, our percentage of reactions is going to run about 6 per cent, and our hogs will run 19 per cent. The average in most places has been 11 to 13 per cent of hogs. We find the retention of hogs last year was approximately eleven and a fraction per cent in the public markets.

I will just briefly give you a little idea of this particular township. We have a record of every man in the state of Illinois. We have the man's name and his residence, the number of old birds, those that react, the old reactors and young reactors, and then the disposition. These are all posted. They are all brought into a common killing-plant and killed under our supervision. Those that are condemned, the farmer loses. For those that are passed for food, we make an arrangement with the local killer. I must say that every killing-plant in the state of Illinois has cooperated in a very splendid way. Those birds are paid for on this basis, approximately (it varies in different plants): Say, for instance, we are paying for old birds fifteen cents. Those birds are New York dressed, passed for food and pay from two and one-half to three cents premium, or from seventeen and one-half to eighteen cents for birds that are received at fifteen cents. You realize that when we open those birds they become seconds, and they are put on the market as seconds.

Here is one of the interesting summaries of Knox County, that is over at Galesburg, as you all know:

Number of flocks tested.....	234
Number of clean flocks.....	88
Number of infected flocks.....	146
Percentage of infection of flocks.....	62.4
Number of chickens injected.....	38,548
Number of old chickens injected.....	16,309
Number of young chickens injected.....	22,239

Here is a point that I want to bring to your attention. We use September first as the time that we change the ages from young to old. This report is of

October 20, so you see there are very few birds which are young birds, mostly eighteen months old.

Number of chickens passed.....	36,858
Number of reactors.....	1650
Number of old reactors.....	648
Number of young reactors.....	48
Percentage of infection.....	4.33
Percentage of old birds.....	10.7
Percentage of young birds.....	2.21
Reactors passed for food.....	1880
Reactors condemned.....	475
Reactors not passed or died.....	35
Number of herds injected.....	100
Number of clean herds.....	52
Number of infected herds.....	48
Percentage of infection of herds.....	48
Number of hogs injected.....	854
Number of hogs that reacted.....	114
Avian type.....	110
Bovine type.....	4

We inject all hogs with both the avian and bovine types of tuberculin.

Percentage of reactors.....	13.34
Avian type (approximately).....	13
Bovine type.....	45

Of both avian and bovine there were just three reactors. The number of farms where both the chickens and hogs were reacting was 41; where neither chickens nor hogs reacted was 27; where chickens reacted and no hogs, 23; where hogs reacted and no chickens, 9.

We have in the state of Illinois what we call standard accredited flocks, flocks which, as you all know, have been culled as true to breed and true to form. I want to show you the results of their work. We have twenty-six of these farms that are in this area work. Of the accredited farms there were just thirteen infected and thirteen that went clean. The chickens that reacted were 187; old birds, 171; young, 16. The percentage of reactions of old birds in these particular accredited farms was 3.6. You see the percentage of reactors of the mine run was 4.33, showing a material reduction by close inspection.

The percentage of reactions of hogs on these farms was 10.9, and the reactions of hogs in the mine run was 13.34.

We will find a large number of these farms with only one or possibly two reactors. They may not be tuberculous birds. We instruct our men to be careful and remove any suspicious birds.

In speaking about the pullorum work, there is one particular point I want to take up. The State Baby Chick Hatcheries Association has met with us a couple of times and is very desirous that the state of Illinois take over the control of pullorum testing. We want to do it, but we are not satisfied as to the most economical way to do the work. We have 161 hatcheries that are accredited in the state of Illinois, with approximately 1,500,000 chickens under control. Mr. Pearson, the Director of Agriculture, Mr. Robinson and Dr. Welch are very enthusiastic in taking over this work, providing an economical and truly scientific way can be developed to do the work. Dr. Graham has met with us several times. We have put over the proposition for another year. We solicit the advice of all the different states as to an economical way to handle that proposition. We want to handle the work through the local practitioners as much as we possibly can. When we put the proposition up to the hatcherymen they wanted commercial hatching, and we simply turned it down. We told them that absolutely no hatching could be done with any birds that were not tested before they were put in the incubator. That was one of the propositions we fell out on the first thing. They wanted to do custom hatching, and we insisted that if the state of Illinois went to the expense of testing the chickens, there must be absolutely nothing but tested eggs that

would go into the incubator. There is one point we have fallen out on, but I think we will get together on that question.

From what experience I have had, the pullorin test has been very unsatisfactory. It is a matter of teaching the man and giving him a reasonable fee for the work. When you consider 161 hatcheries in the State and 1,500,000 chickens, it involves a large amount of money. But I will say I think the psychology has worked in the state of Illinois. At the present time we have got back of us the chicken industry which is very, very great in Illinois. We have back of us the different hatcherymen, and we want to go before the legislature and ask for a reasonable amount of money for the continuance of our work. (Applause)

DR. KINSLEY: What is the basis, in postmortem inspection, for passing poultry for food or condemning it?

DR. CHAMBERLAIN: If we open the bird and find the liver has one little spot, a very small spot, and the spleen is not involved, we pass the bird as fit for food. We realize the bird should be drawn, but we realize that we oftentimes are overlooking extensive lesions in the intestines. Wherever we have a reasonably clean liver and spleen, we pass the bird as fit for food. I will say that out condemnations vary from 20 to 35 per cent of our reactors. We try to use good common sense in that regard. We have certain killing-plants where they freeze the bird to 15 or 20 degrees below zero, where the bird can be economically drawn and handled, but usually the birds are simply cooled and shipped to Chicago or shipped to the East and placed in cold storage. The endeavor of our inspectors is that every bird shall be absolutely fit for food. That is as near as I can tell you. We try to use common sense.

DR. C. P. FITCH: I move the adoption of the report of the Committee on Avian Tuberculosis.

DR. J. W. CONNAWAY: I second the motion.

PRESIDENT WIGHT: Those in favor of adopting the report as presented will please signify by saying "aye;" those opposed, "no." It is carried.

The next will be a brief report on the entire work that this Committee has done. That will be presented at this time by Dr. Stafseth.

DR. H. J. STAFSETH: The other reports were on specific diseases, and this is a general report applying to poultry diseases as a whole.

Dr. Stafseth read the report.

REPORT OF COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY

DR. A. F. SCHALK, *Chairman*, Columbus, Ohio

Dr. Hubert Bunyea, Washington, D. C. Dr. E. L. Stubbs, Philadelphia, Pa.

Dr. H. J. Stafseth, East Lansing, Mich.

The rapid and almost phenomenal ascension of the poultry industry during the last fifteen years has elevated this class of live stock to a very high plane among America's foremost agricultural enterprises. Accompanying this material progress and running parallel with its advancement there has developed an unusual interest in the health of poultry as evidenced by flock-owners' inquiries into their poultry cases.

Conditions of improper hygiene and sanitation, consisting chiefly of close confinement of large numbers of birds, inefficient housing, yarding and ranging, faulty nutrition and general poor care and management are the more important factors which contribute to the unusually high mortality rate and low production in many flocks. The average poultryman does not understand the underlying principles of disease and its prevention, and the economic urge involved compels him to appeal to some agency for assistance and relief.

To whom can he apply for this much needed assistance? This field of service certainly belongs in the domain of the veterinarian. But we may ask: Can he obtain efficient and satisfactory service from the average veterinarian? The general apathetic attitude of our profession as regards poultry hygiene and pathology, until quite recently, has not been very conducive to the accumulation of dependable and reliable knowledge pertaining to the prevention, control or correction of poultry diseases. Since the veterinarian has not shown a very

sympathetic spirit toward the poultryman's troubles and has not manifested much inclination to cater to his needs, he has been forced to consult other agencies, such as poultry extension workers, so-called poultry specialists, and often falls prey to the vendors and peddlers of worthless poultry remedies.

In order that the veterinary practitioner may be more able to qualify for, cater to, and make an earnest effort to recover and retain this valuable field of service in the ranks of the profession, your Committee herewith submits the following recommendations:

1. That all veterinary colleges immediately project and introduce appropriate courses in poultry hygiene and pathology as required subjects in their academic veterinary curricula.
2. That veterinary colleges hold special poultry conferences, intensive poultry short courses and graduate courses in poultry hygiene and pathology for graduate veterinarians.
3. That in states that have extension veterinarians, poultry hygiene and pathology be made a distinct feature of their extension service to the practicing veterinarian.
4. That all veterinary organizations stress poultry hygiene and pathology at their association meetings.
5. That all state and federal sanitary and regulatory authorities specifically instruct their field agents to spread the gospel of proper hygiene and sanitation to poultry-owners whenever the occasion presents itself.
6. That all veterinarians, who are in any way associated with poultry problems, avail themselves of all possible opportunities to further their knowledge on poultry hygiene and pathology, that they may more adequately prepare and qualify themselves for this very important field of veterinary service, which at present is largely in other hands.

It was duly move and seconded that the report be adopted. The motion was carried.

DR. C. P. FITCH: There are one or two remarks I would like to make in regard to the papers which have been read. I want to refer, particularly to the veterinary sanitary officers of the different states, the necessity of keeping in mind the disease which was reported in the paper by Dr. Schalk and read by Dr. Stubbs. There is no doubt whatever, in my mind, that the disease, which can be called laryngotracheitis or infectious bronchitis, or whatever terminology you desire to give it, is at the present time in the Central West and Northwest the most important disease affecting baby chicks. The losses occasioned by this disease are in nowise exceeded by those of bacillary white diarrhea. The problem is increasing annually. It is, in my belief, within the province of the sanitary officers of the various states to take this into very definite cognizance in regard to control measures if they expect to render their full service to the poultry industry.

The paper on leucemia brings to mind two recent articles that have appeared within the last month in respect to this disease, one in the *Journal of Comparative Pathology and Therapeutics*, in which this disease is designated as big liver disease, and which gives a definite classification of the various pathology which we find; the other in *Archiv für wissenschaftliche und praktische Tierheilkunde* gives a very excellent differentiation of the pathology which we find so common in connection with this infection. One phase was not touched on by Dr. Stubbs, or at least I did not hear it, and that is the apparent genetic phase that this disease has.

One of the first papers on this was presented by Dr. F. P. Mathews, recently of Purdue University, and other articles have appeared in European literature. There is undoubtedly a definite genetic phase or inheritability in certain aspects of this disease. When I say "certain aspects" we have such a varied pathology that what we have commonly grouped under leucemia probably represents a number of different pathological entities.

Finally, in respect to the control of pullorum disease, we have been feeling our way in the state of Minnesota. We have not quite as many hatcheries as have been reported by Dr. Chamberlain, but we do have well over 800,000 birds producing eggs for hatching purposes. Last year we tested something

over 25,000. This year we will probably test something over 100,000 birds. The cost has been decreased, but it is still considerable, and we are not much more than scratching the surface. In other words, if this disease is to be controlled on the basis of the agglutination test, performed either by practitioners or in the laboratory, and conducted annually, as it will have to be done, the cost is going to be enormous in those states where the poultry industry assumes as much importance as it does in many of our central western states.

Sanitary officials should not go into this work without careful consideration of the costs involved and the values received from those costs. (Applause)

DR. J. W. CONNAWAY: Mr. Chairman, I think the report given by Dr. Bunyea and the recommendations are very fine. Everything that Dr. Fitch has said with regard to these other diseases is applicable to this, I think, in double force.

When we have some new disease, we usually get very much excited about it, especially if it is one that spreads rapidly over the country. But these slow, insidious diseases we are not likely to get very much excited about, yet they creep along inch by inch, mile by mile, until they spread from one border of our country to the other. That is what is happening with this disease.

Within the memory of most of us here, there was very little of this disease except along the northern border of our country. I have been on my job for a good many years. It was only a very few years ago that I saw a case of tuberculosis in a specimen of poultry sent into our laboratory for examination. Our first specimens came from along the northern border near Iowa. Dr. Van Es and Dr. Schalk had been dealing with that disease for a number of years up in North Dakota.

Our next trouble was down around the State Fair region, where someone had brought show birds, and it evidently spread through these birds that had been brought in for show. I think every possible measure that can be applied, should be applied to stop the spread of this disease.

DR. A. J. DEFOSSET: I was very much impressed with the report of Dr. Bunyea and especially with that part of the report that made reference to educational work. There is also mentioned in that report that the state and federal officials will probably need to head up the educational work. In thinking seriously over this matter of educational work, we are immediately confronted with a problem: Whom have we who is adequately trained to do this educational work? Undoubtedly there are many workers in the research field who are qualified. I, of course, am referring now to our men in regulatory work.

Very recently we had a short course in poultry diseases at Ohio State University. It was made available through the efforts of our dean, Dr. Brumley. I had the pleasure of attending. We had some very able instructors who gave us very valuable information on poultry diseases. I don't want to elaborate on that. There are three or four of those instructors here, and I don't want them to feel that I am making this remark just simply to throw bouquets. But there were only thirty-five, I believe, or some such number of men available to take that course. I understand the course is going to be repeated. Possibly two or three such courses are going to be given. If other institutions have not already given such courses, I hope they will do so and lose no time in doing so. Those courses are indeed very valuable to the practitioner and also to the regulatory worker.

If we go out and try to sell tuberculosis eradication to the farmers, we are going to need to be informed on that disease thoroughly and fully, not only on tuberculosis but other poultry diseases. We have to know poultry diseases. We have to take an interest in them or we are not going to be able to sell poultry diseases and poultry sanitation successfully to the farmers or to poultry-owners.

But what I want to stress particularly is the need of courses such as we recently had at the Ohio State University. We had in that class men from Illinois, Indiana and Michigan. There was a man there from Rhode Island and I presume there were men from other states. In the expressions I heard at the close of the course there was a note of regret that all the veterinarians in the state of Ohio couldn't avail themselves of that course. (Applause)

PRESIDENT WIGHT: Is there anything further on this subject? If not, that completes the program.

. . . The meeting recessed at 12 noon. . . .

FRIDAY AFTERNOON, DECEMBER 5, 1930

The sixth and final session convened at 1:40 p. m., President Wight presiding.

PRESIDENT WIGHT: Gentlemen, please come to order for the afternoon session.

This afternoon, as you know, is taken up largely with committee reports. The first is that on Tick Eradication, to be presented by Dr. N. F. Williams, State Veterinarian of Texas. (Applause)

. . . Dr. Williams read the report. . . .

REPORT OF COMMITTEE ON TICK ERADICATION

DR. N. F. WILLIAMS, *Chairman*, Fort Worth, Texas

Dr. J. V. Knapp, Tallahassee, Fla. Dr. R. A. Ramsay, Washington, D. C.
Dr. E. P. Flower, Baton Rouge, La. Dr. G. B. Bradshaw, Jackson, Miss.
Dr. J. H. Bux, Little Rock, Ark. Dr. C. A. Cary, Auburn, Ala.

UNITED STATES DEPARTMENT OF AGRICULTURE

Bureau of Animal Industry

Washington, D. C.

Progress in Tick Eradication—July 1, 1906, to December 1, 1930

STATES	COUNTIES QUAR- AN- TINED JULY 1, 1906	COUNTIES QUARAN- TINED DEC. 1, 1930		COUNTIES RELEASED TO DEC. 1, 1930		AREA QUAR- AN- TINED JULY 1, 1906	AREA QUAR- AN- TINED DEC. 1, 1930	AREA RELEASED TO DECEMBER 1, 1930	
		WHOLE	PART	WHOLE	PART			SQUARE MILES	PER CENT
	No.	No.	No.	No.	No.	SQUARE MILES	SQUARE MILES	SQUARE MILES	PER CENT
Alabama	67	0	0	67	0	51,279	0	51,279	100
Arkansas	75	14	1	60	1	52,525	10,570	41,955	80
California	15	0	0	15	0	79,924	0	79,924	100
Florida	67	31	1	35	1	54,861	27,137	27,724	51
Georgia	158	0	0	158	0	57,438	0	57,438	100
Kentucky	2	0	0	2	0	841	0	841	100
Louisiana	64	39	3	22	3	45,409	32,727	12,682	28
Mississippi	82	0	0	82	0	46,362	0	46,362	100
Missouri	4	0	0	4	0	1,386	0	1,386	100
No. Carolina	73	0	0	73	0	37,365	0	37,365	100
Oklahoma	61	0	0	61	0	47,890	0	47,890	100
So. Carolina	46	0	0	46	0	30,495	0	30,495	100
Tennessee	42	0	0	42	0	16,987	0	16,987	100
Texas	198	56	1	141	1	191,885	55,808	136,077	71
Virginia	31	0	0	31	0	13,918	0	13,918	100
TOTALS	985	140	6	839	6	728,565	126,242	602,323	83

Area released July 1, 1930. 9,746 square miles.
Area released December 1, 1930. 15,210 square miles.

Total area released calendar year 1930. 24,956 square miles.
(No area requarantined during calendar year 1930)

TICK ERADICATION IN 1930

The year drawing to a close shows a gain of 24,856 square miles of southern territory reclaimed from the cattle fever tick and released from federal quarantine. During the year, two releases of territory were made by the United States Department of Agriculture. The first became effective on July 1, 1930, when 17 south Mississippi counties were released, and the second on December 1, 1930, when four counties and part of one county in Arkansas, five counties and part of one county in Florida, and nine counties and parts of three counties in Texas, were released. The release in Mississippi removed the entire state from quarantine, and it thus became the eleventh of the original 15 infested states that have been freed from quarantine restrictions through a systematic program of tick eradication. The other states that have been wholly released from federal quarantine are: Alabama, California, Georgia, Kentucky, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee and Virginia. During the year, 66 counties were added to the list of released counties reported absolutely tick-free, making a total of 783 of the 839 released counties in which tick eradication is completed. The Bureau of Animal Industry Statement of Progress made in this work to December 1, 1930, is appended for the Association's records.

LOUISIANA

The situation regarding tick eradication in this state is very little changed, in comparison to report of last year.

We were successful in having a tick eradication measure passed during the 1930 General Assembly but failed to secure necessary appropriation to carry the program into effect, up to this time. All efforts are now being directed to some final scheme that will provide the necessary funds to place this important project, in accordance with provisions of enacted legislative measure, completely under state and federal control.

There are thirty-nine whole parishes and parts of three other parishes in quarantine; twenty-two whole parishes and parts of three other parishes released from quarantine.

E. P. F.

ARKANSAS

Systematic work was discontinued in Clark, Hot Springs, Miller, Pike and Howard counties on June 30, 1930. Since that time, due to lack of state funds, activities have been directed solely to the patrol of the quarantine line and final tick eradication in the released counties and such other counties as contain infestation along the quarantine line; the last status report showing twelve final counties.

We have remaining fifteen infested counties in the State and since our laws have been sustained in every instance and the stock-owners in the remaining quarantine area are stronger for cattle tick eradication than ever before, it has become merely a matter of providing finance by the legislature. There is considerable sentiment among the legislators to provide sufficient funds for the complete eradication of cattle fever ticks from the State within the next two-year period. The sentiment among the legislators is more favorable and stronger than it ever has been in the history of the project in the State.

J. H. B.

FLORIDA

The following counties are free of the cattle fever tick and have been released from state and federal quarantine: Escambia, Santa Rosa, Okaloosa, Walton, Holmes, Washington, Bay, Jackson, Calhoun, Gulf, Franklin, Liberty, Gadsden, Leon, Wakulla, Jefferson, Madison, Taylor, Lafayette, Dixie, Hamilton, Suwannee, Columbia, Baker, Union, Monroe, Dade, Broward, Palm Beach and Martin, and recommended for release from federal quarantine, December 1, 1930, are the counties of Nassau, Clay, Bradford, Gilchrist, Levy and that part of Duval County lying north and west of the St. Johns River.

The work of systematic tick eradication is in progress at the present time in Alachua, Marion, Putnam, St. Johns, Flagler, Volusia, the remainder of Duval County and the north portion of Lake County. This area should be free of the cattle fever tick and ready for release on or about July 1, 1931.

The work of preliminary tick eradication, vat construction and quarantine fence line building is in progress at this time and systematic tick eradication work will be inaugurated, March 1, 1931, in the following counties: Citrus, Sumter, Lake, Orange, Seminole, Brevard, Indian River, St. Lucie and small portions of Osceola and Okeechobee counties.

The territory we plan to work during 1931 is larger than any area previously worked in this State and connects our tick-free area on the south with the working area on the north and leaves but seventeen counties remaining in the tick-infested area of Florida.

The live stock improvement campaign inaugurated and carried on by this department in areas freed of the cattle fever tick is proceeding nicely and in my opinion is the principal factor in developing favorable sentiment for tick eradication in Florida. To date we have introduced over eight hundred head of purebred beef-type cattle for crossing on our native range cows.

J. V. K.

TEXAS

The Texas situation is as follows:

Counties recommended for release, Dec. 1, 1930: Cass, Marion, Harrison, Gregg, Henderson, Travis, Hays, Kleberg, Smith, part of Limestone, and the remainders of Wharton and Matagorda.

Eight thousand four hundred thirteen square miles released.

The working area is lined up in better shape than has been the case for several years, and this accounts in part for the excellent results obtained in cleaning up during 1930 the remaining quarantined premises in 22 additional released counties.

The work will be taken up in a number of inactive counties during season of 1931.

N. F. W.

PRESIDENT WIGHT: Gentlemen, you heard the report. What is your desire?

It was regularly moved and seconded that the report be adopted. The motion was carried.

PRESIDENT WIGHT: The report of the Committee on Unification of Laws and Regulations will be presented by Dr. William Moore, State Veterinarian of North Carolina. (Applause)

Dr. Moore read the report.

REPORT OF COMMITTEE ON UNIFICATION OF LAWS AND REGULATIONS

DR. WILLIAM MOORE, *Chairman*, Raleigh, N. Car.

Dr. E. T. Faulder, Albany, N. Y.	Dr. Edward Records, Reno, Nevada
Dr. Elmer Lash, Washington, D. C.	Dr. J. H. McNeil, Trenton, N. J.
Dr. T. E. Robinson, Providence, R. I.	Dr. T. H. Ruth, Pierre, S. Dak.

Since it was not possible for your Committee to have a meeting, it was necessary to prepare this report by correspondence with the members.

A review of the reports, five in number, of this Committee, shows that splendid recommendations have been made covering the inter- and intrastate movement of live stock. We would especially call your attention to the report of 1925. This report contains a splendid outline for uniform regulations.

The report of 1926 called attention to a decision of the Supreme Court of the U. S., October term, 1925, styled "Oregon-Washington Railroad and Navigation Company, plaintiff in error v. State of Washington." Briefly, it was decided that a quarantine issued by a state to protect itself from the introduction of a plant disease from another state was invalid because of the fact that Congress had enacted the Federal Plant Quarantine Act of August 20, 1912. Congress thereupon amended the Plant Quarantine Act on April 13, 1926, so as to give the states the right to establish and enforce quarantine for plant diseases until the federal government establishes a quarantine under its Act.

It is generally understood and conceded that a state has exclusive authority under state laws and regulations to govern the movement of live stock and

poultry within its borders, but in the matter of placing embargoes against importation from other states they are faced with federal law relating to interstate commerce. This law was enacted by the Congress under its authority granted by the interstate commerce clause of the Constitution, which gives the Congress exclusive jurisdiction over commerce between states. The effect of the operation of this law was first brought to public attention in a Missouri State case where the State Board of Agriculture, in 1918, prosecuted the Chicago, Milwaukee and St. Paul Railroad for violating a state regulation issued in September, 1911, restricting the movement of cattle into Missouri in connection with its bovine tuberculosis eradication campaign. The defendant was convicted in the trial court of Grundy County, Missouri, and a fine of \$1,000.00 was imposed. Appeal was taken to the State Supreme Court, but the case was transferred to the Kansas City Court of Appeals. The Court in its decision stated: "Undoubtedly Congress has the power granted by the federal Constitution to regulate all material phases of such commerce to the exclusion of all state regulations and penalties."

About two years ago, the states of Oregon and Washington issued regulations requiring the testing of baby chicks before their entrance into these states. Certain interests in California in the case of Must Hatch Incubator Company v. I. L. Patterson and others, attacked the right of these states to enforce the regulations which they had promulgated. The outcome was that the Federal District Court held with the California interests in a decision on May 14, 1928, on the ground that the regulations issued by Oregon and Washington in this instance involved interstate commerce; that the federal government already had on its statute books laws which covered the subject and that the federal laws alone applied to such interstate shipments of poultry. The decision of the Supreme Court in the case Oregon-Washington Railroad and Navigation Company v. State of Washington, referred to above, was cited with approval in the case involving the pullorum disease regulations of Oregon and Washington. It is assumed that what is true as to the situation with regard to pullorum disease and bovine tuberculosis also applies to any other contagious disease of live stock.

In order to assist state officials to protect themselves in the absence of federal regulations, a joint resolution, known as the Walsh Resolution, was introduced in Congress on April 18, 1929, having for its object the amendment of existing federal laws so as to permit the various states to promulgate and enforce quarantines which shall remain effective until such time as the federal government shall itself establish quarantines covering the same subject matter. This resolution, which has the approval of the federal department of Agriculture, is still pending, having passed one branch of Congress, the Senate, on May 23, 1930. A Special Committee on Legislation was appointed this year to handle this matter. We urge every member of this Association to assist this Committee in securing this much needed legislation from Congress.

May we also call your attention to the report of our Committee in 1926, regarding the use of the word "accredited" in connection with poultry disease control work, and the suggestions and recommendations in the 1927 report and the report of 1928.

In June, 1930, the state veterinarians of the southeastern states met at Charlotte, N. C., to form a Southeastern States Live Stock Sanitary Association. Common problems and uniform regulations were discussed. A uniform regulation, requiring a tuberculin test of chickens over four months of age shipped into the states, was approved. We believe that such associations should be formed in every section of the country. This was recommended in the 1925 report and adopted by the western states.

We believe that more uniformity of regulations in regard to the tuberculin test covering the interstate movement of cattle is desirable, but we believe that this is a matter that should be handled by the Committee on Tuberculosis.

We make the following suggestions without recommendations for the consideration of the Association.

1. The advisability of discontinuing the mallein-testing of horses for entry into the several states. A number of states are not now requiring this.

2. A uniform regulation covering the shipping of live stock, especially hogs, by truck. The trucking of hogs to market is rapidly increasing and regulations

to cover this are perhaps more important than regulations on shipments made by rail. Many shipments by truck are made without the restrictions we require of the railroads. It is reported that some state regulations require the cleaning and disinfecting of all railroad cars hauling hogs to market, but do not require this of trucks. A regulation to cover this should be approved by the Bureau and it would seem desirable that they also include this in their regulations.

3. A more uniform regulation in regard to the abortion test on cattle shipped into the several states that now have such a requirement and the adoption by the Bureau of a regulation prohibiting the shipping of cattle interstate that are known to be affected with bovine infectious abortion.

PRESIDENT WIGHT: Gentlemen, you have heard the report. What is your pleasure?

It was regularly moved and seconded that the report be adopted. The motion was carried.

PRESIDENT WIGHT: The report of the Committee on Miscellaneous Transmissible Diseases will be presented by Dr. A. W. Miller, Assistant Chief of the Bureau of Animal Industry. (Applause)

DR. A. W. MILLER: Mr. President, before reading this report, your Committee has a question to submit for your consideration on which it is seeking some light. Dr. Givens, of Virginia, and Dr. Jones, of Tennessee, when we were trying to decide the scope of our report, suggested that there be some discussion of John's disease. The question immediately came up as to whether this Committee or the Committee on Tuberculosis should deal with that disease. We would like to be enlightened with respect to that matter, so that the Committee next year may know just what its function will be.

DR. MAYO: As John's disease is quite similar to tuberculosis in many respects, and particularly with reference to its diagnosis, I move that John's disease be referred to the Committee on Tuberculosis for consideration.

The motion was regularly seconded and carried.

Dr. Miller then read the report.

REPORT OF COMMITTEE ON MISCELLANEOUS TRANSMISSIBLE DISEASES

DR. A. W. MILLER, *Chairman*, Washington, D. C.

Dr. C. A. Deadman, Madison, Wis. Dr. H. M. Newton, Charleston, W. Va.
Dr. Jacob Traum, Berkeley, Calif. Dr. W. H. Hendricks, Salt Lake City, Utah
Dr. H. C. Givens, Richmond, Va. Dr. J. M. Jones, Nashville, Tenn.

As there have been no very important developments during the year in the field covered by your Committee, its report will be limited to a review of certain aspects of the situation with respect to foot-and-mouth disease, hemorrhagic septicemia, and rabies that we believe will be of interest to members of this Association.

FOOT-AND-MOUTH DISEASE

No outbreak of foot-and-mouth disease has occurred this year in the United States and there has been practically no change in the world situation with respect to the disease. England enjoyed freedom from the affection from December 24, 1929, to September 6, 1930, the longest period without an outbreak for several years. In that country, where the slaughter policy is followed, the authorities recently modified their procedure somewhat by authorizing experimentally the administration of serum treatment to animals which have been in contact with diseased animals or which have otherwise been exposed to infection. The order of the British authorities with reference to this procedure reads in part as follows:

"2. Serum contains no curative properties, nor will it prevent the development of the disease in an animal which is already in the incubative stage. If, however, serum is administered to an animal which, although not itself infected, may be exposed to the danger of infection, experience abroad shows that it will afford protection against the disease for a period of about ten days in a high percentage of cases.

"3. These results warrant a close examination of this subject in relation to actual outbreaks in this country, inasmuch as the temporary protection which may thus be secured to animals which are exposed to infection may be expected to:

(a) Diminish secondary outbreaks in the immediate vicinity of the origin center, and thus limit the number of foci to be dealt with,

(b) Reduce the number of animals which it is necessary to slaughter for the purpose of preventing the spread of disease, and

(c) At the same time reduce the areas over which it is necessary to impose restrictions upon the business of farmers and live stock salesmen.

"4. In these circumstances the Minister proposes to apply serum treatment to a number of future outbreaks in which the circumstances are favorable. In the first instance this procedure will be of an experimental character and the results will be closely examined before the question of the adoption of serum procedure as a general rule is considered. During the progress of this experiment the slaughter policy which has been the means of eradicating the disease from this country for many years will remain the basic policy."

HEMORRHAGIC SEPTICEMIA

It is the conclusion of your Committee from all the information it has been able to obtain that this year's losses from hemorrhagic septicemia have been less serious than during the past two or three years. We invite your attention to a recent experiment with bacterins conducted by Mr. J. H. Mercer, Live-stock Sanitary Commissioner of Kansas, with the coöperation of the Division of Veterinary Medicine of the Kansas State Agricultural College, the federal Bureau of Animal Industry, and the live stock and traders' exchanges and the stockyard companies at Kansas City and Wichita. A brief summary of the work accomplished is given in the following table:

	<i>Treated</i>	<i>Untreated</i>
Number of animals.....	25,699	201,605
Died	144	562
Per cent of deaths0056	.0027

These results, which show the percentage of animals that died was greater among the treated lots than among those which were not vaccinated, closely parallel the results obtained by the federal Bureau of Animal Industry in a similar experiment which it conducted several years ago, and furnishes additional evidence to support the position that this Committee has taken in recent years that the vaccination of feeder and stocker cattle while in transit, or within a few days after they reach their destination, is of doubtful value.

RABIES

Available data indicate that numerous outbreaks of rabies have occurred this year in many different parts of the United States. Your Committee, in its report last year, referred to some experimental work that was being carried on by the federal Bureau of Animal Industry with vaccines rendered avirulent by chloroform. Further potency tests of such vaccines have been conducted this year by that Bureau with dogs as the test animals. Although the results of these tests have not been entirely conclusive, owing to the rather small percentage of control animals which developed rabies, additional evidence was obtained to indicate that chloroform-treated vaccines are capable of producing a high degree of immunity in dogs. This type of vaccine was used on approximately 150 dogs at an Army post and on 30 dogs in the Bureau laboratories with no evidence of discomfort to the animals. Furthermore, nothing suggestive of post-vaccination paralysis was observed in any of these dogs. Chloroform-treated vaccines are now being prepared commercially and no doubt before long it will be possible to form some judgment as to the efficacy of this product under field conditions.

It was regularly moved and seconded that the report be adopted. The motion was carried.

PRESIDENT WIGHT: We will now have the report of the Special Committee on Legislation, provided for last year by the Executive Committee of this

Association. This report will be presented by Dr. W. J. Butler, State Veterinarian of Montana, who is the Chairman. (Applause)

Dr. W. J. BUTLER: This report has been submitted to the Executive Committee and has the Executive Committee's approval.

Dr. Butler read the report. . . .

REPORT OF SPECIAL LEGISLATIVE COMMITTEE

Dr. W. J. BUTLER, *Chairman*, Helena, Mont.

Mr. J. H. Mercer, Topeka, Kans.

Dr. P. F. Bahnsen, Americus, Ga.

Your Special Legislative Committee, appointed for the purpose of securing federal legislation granting authority to the respective states to make regulations governing the importation of live stock and poultry into the various states, worked diligently to secure this legislation, but owing to unfavorable action arising in the House of Representatives the necessary legislation failed in that body.

Your Committee met at Washington, Monday, April 14. The meeting was attended also by Dr. C. E. Cotton, Executive Officer of the Minnesota State Live Stock Sanitary Board, and Dr. T. E. Munce, Director of the Bureau of Animal Industry of Pennsylvania.

The delay in meeting was due to the Tariff Bill. Your Committee had taken up the matter of this legislation with Honorable T. J. Walsh, Senator from Montana, shortly after the appointment of the Committee. At our request, Senator Walsh, early in the session, introduced the following resolution, officially designated as Senate Joint Resolution Number 9, which gives to the states the right to promulgate regulations governing the importation of live stock and poultry:

Calendar No. 719

S. J. RES. 9

(Report No. 712)

IN THE SENATE OF THE UNITED STATES

April 18, 1929.

Mr. WALSH of Montana introduced the following joint resolution; which was read twice and referred to the Committee on Agriculture and Forestry

May 22, 1930.

Reported by Mr. McNary, with amendments

JOINT RESOLUTION

For the amendment of the Acts of February 2, 1903, and March 3, 1905, as amended to allow the State to quarantine against the shipment thereto, therein, or through of live stock, including poultry, from a State or Territory or portion thereof, where a live stock or poultry disease is found to exist, which is not covered by regulatory action of the Department of Agriculture, and for other purposes.

Resolved by the Senate and House of Representatives of The United States of America in Congress Assembled, That the Act of February 2, 1903 (Thirty-second United States Statutes at Large, page 792), as amended by the Act of February 7, 1928 (Forty-fifth United States Statutes at Large, page 59), be, and the same is hereby, further amended by adding at the end of Section 2 thereof the following:

"Provided, That until the Secretary of Agriculture shall have made regulations and taken measures to prevent the introduction or dissemination of the contagion of a contagious, infectious, or communicable disease of live stock, including live poultry, from one State or Territory or the

District of Columbia to another, nothing in said Act shall prevent or shall be construed to prevent any State, Territory, or District from enacting, promulgating, and enforcing any quarantine, prohibiting or restricting the transportation of any live stock, including live poultry, into or through such State, Territory, District, or portion thereof, from any other State, Territory, District, or portion thereof, when it shall be found by the State, Territory, or District promulgating or enacting the same, that such contagious, infectious, or communicable disease exists in such other State, Territory, District, or portion thereof: *Provided Further*, That no quarantine so enacted shall be based upon a specific test which is not a test recognized and approved by the Secretary of Agriculture: *And Provided Further*, That the Secretary of Agriculture is hereby authorized, whenever he deems such action advisable and necessary to carry out the purposes of this Act, as amended, to cooperate with any State, Territory, or District, in connection with any quarantine, enacted or promulgated by such State, Territory, or District, as specified in the preceding provisos; *If the Secretary of Agriculture, after proper investigation shall determine that a quarantine of a state, territory, or the District of Columbia, as authorized in this paragraph, is unwarranted or no longer necessary, he shall by order terminate the same and such quarantine shall thereupon cease.*"

Sec. 2. That the Act of March 3, 1905 (Thirty-second United States Statutes at Large, page 1264), as amended by the Acts of March 4, 1913 (Thirty-seventh United States Statutes at Large, page 831), and February 7, 1928 (Forty-fifth United States Statutes at Large, page 59), be, and the same is hereby, further amended by adding at the end of section 1 thereof the following:

"Provided, That until the Secretary of Agriculture shall have determined the fact that cattle or other live stock, including poultry, are affected with a contagious, infectious, or communicable disease, and has quarantined a State, Territory, or the District of Columbia, or a portion thereof, with reference to such disease, as provided in this Act, as amended, nothing in said Act shall prevent or shall be construed to prevent any State, Territory, or District from enacting, promulgating, and enforcing any quarantine, prohibiting or restricting the transportation of any live stock, including live poultry, into or through such State, Territory, District, or portion thereof, from any other State, Territory, District, or portion thereof, when it shall be found, by the State, Territory, or District promulgating or enacting the same, that such contagious, infectious, or communicable disease exists in such other State, Territory, District, or portion thereof: Provided Further, That no quarantine so enacted shall be based upon a specific test which is not a test recognized and approved by the Secretary of Agriculture: And Provided Further, That the Secretary of Agriculture is hereby authorized, whenever he deems such action advisable and necessary to carry out the purposes of this Act, as amended, to cooperate with any State, Territory, or District, in connection with any quarantine, enacted or promulgated by such State, Territory, or District, as specified in the preceding provisos; If the Secretary of Agriculture after proper investigation shall determine that a quarantine of a State, Territory, or the District of Columbia, as authorized in this paragraph, is unwarranted or no longer necessary, he shall by order terminate the same and such quarantine shall thereupon cease."

Your Committee was advised, however, that as long as the Senate was struggling with the Tariff Bill it would give no attention whatever to other legislation. Immediately upon the enactment of the tariff legislation, Senator Walsh arranged for a hearing on S. J. R. No. 9 before the Senate Committee on Agriculture and Forestry.

At an informal meeting on April 14, your Committee met with Senator Walsh in his office and went into the many details relative to this desired legislation. Senator Walsh was most courteous and agreed to go with your Committee and appear at the formal hearing before the Senate Committee on Agriculture and Forestry.

Association. This report will be presented by Dr. W. J. Butler, State Veterinarian of Montana, who is the Chairman. (Applause)

DR. W. J. BUTLER: This report has been submitted to the Executive Committee and has the Executive Committee's approval.

Dr. Butler read the report.

REPORT OF SPECIAL LEGISLATIVE COMMITTEE

DR. W. J. BUTLER, *Chairman*, Helena, Mont.

Mr. J. H. Mercer, Topeka, Kans.

Dr. P. F. Bahnsen, Americus, Ga.

Your Special Legislative Committee, appointed for the purpose of securing federal legislation granting authority to the respective states to make regulations governing the importation of live stock and poultry into the various states, worked diligently to secure this legislation, but owing to unfavorable action arising in the House of Representatives the necessary legislation failed in that body.

Your Committee met at Washington, Monday, April 14. The meeting was attended also by Dr. C. E. Cotton, Executive Officer of the Minnesota State Live Stock Sanitary Board, and Dr. T. E. Munce, Director of the Bureau of Animal Industry of Pennsylvania.

The delay in meeting was due to the Tariff Bill. Your Committee had taken up the matter of this legislation with Honorable T. J. Walsh, Senator from Montana, shortly after the appointment of the Committee. At our request, Senator Walsh, early in the session, introduced the following resolution, officially designated as Senate Joint Resolution Number 9, which gives to the states the right to promulgate regulations governing the importation of live stock and poultry:

Calendar No. 719

S. J. RES. 9

(Report No. 712)

IN THE SENATE OF THE UNITED STATES

April 18, 1929.

Mr. WALSH of Montana introduced the following joint resolution; which was read twice and referred to the Committee on Agriculture and Forestry

May 22, 1930

Reported by Mr. McNary, with amendments

JOINT RESOLUTION

For the amendment of the Acts of February 2, 1903, and March 3, 1905, as amended to allow the State to quarantine against the shipment thereto, therein, or through of live stock, including poultry, from a State or Territory or portion thereof, where a live stock or poultry disease is found to exist, which is not covered by regulatory action of the Department of Agriculture, and for other purposes.

Resolved by the Senate and House of Representatives of The United States of America in Congress Assembled, That the Act of February 2, 1903 (Thirty-second United States Statutes at Large, page 792), as amended by the Act of February 7, 1928 (Forty-fifth United States Statutes at Large, page 59), be, and the same is hereby, further amended by adding at the end of Section 2 thereof the following:

"Provided, That until the Secretary of Agriculture shall have made regulations and taken measures to prevent the introduction or dissemination of the contagion of a contagious, infectious, or communicable disease of live stock, including live poultry, from one State or Territory or the

District of Columbia to another, nothing in said Act shall prevent or shall be construed to prevent any State, Territory, or District from enacting, promulgating, and enforcing any quarantine, prohibiting or restricting the transportation of any live stock, including live poultry, into or through such State, Territory, District, or portion thereof, from any other State, Territory, District, or portion thereof, when it shall be found by the State, Territory, or District promulgating or enacting the same, that such contagious, infectious, or communicable disease exists in such other State, Territory, District, or portion thereof: *Provided Further*, That no quarantine so enacted shall be based upon a specific test which is not a test recognized and approved by the Secretary of Agriculture: *And Provided Further*, That the Secretary of Agriculture is hereby authorized, whenever he deems such action advisable and necessary to carry out the purposes of this Act, as amended, to cooperate with any State, Territory, or District, in connection with any quarantine, enacted or promulgated by such State, Territory, or District, as specified in the preceding provisos; *If the Secretary of Agriculture, after proper investigation shall determine that a quarantine of a state, territory, or the District of Columbia, as authorized in this paragraph, is unwarranted or no longer necessary, he shall by order terminate the same and such quarantine shall thereupon cease.*"

Sec. 2. That the Act of March 3, 1905 (Thirty-second United States Statutes at Large, page 1264), as amended by the Acts of March 4, 1913 (Thirty-seventh United States Statutes at Large, page 831), and February 7, 1928 (Forty-fifth United States Statutes at Large, page 59), be, and the same is hereby, further amended by adding at the end of section 1 thereof the following:

"Provided, That until the Secretary of Agriculture shall have determined the fact that cattle or other live stock, including poultry, are affected with a contagious, infectious, or communicable disease, and has quarantined a State, Territory, or the District of Columbia, or a portion thereof, with reference to such disease, as provided in this Act, as amended, nothing in said Act shall prevent or shall be construed to prevent any State, Territory, or District from enacting, promulgating, and enforcing any quarantine, prohibiting or restricting the transportation of any live stock, including live poultry, into or through such State, Territory, District, or portion thereof, from any other State, Territory, District, or portion thereof, when it shall be found, by the State, Territory, or District promulgating or enacting the same, that such contagious, infectious, or communicable disease exists in such other State, Territory, District, or portion thereof: *Provided Further*, That no quarantine so enacted shall be based upon a specific test which is not a test recognized and approved by the Secretary of Agriculture: *And Provided Further*, That the Secretary of Agriculture is hereby authorized, whenever he deems such action advisable and necessary to carry out the purposes of this Act, as amended, to cooperate with any State, Territory, or District, in connection with any quarantine, enacted or promulgated by such State, Territory, or District, as specified in the preceding provisos; *If the Secretary of Agriculture after proper investigation shall determine that a quarantine of a State, Territory, or the District of Columbia, as authorized in this paragraph, is unwarranted or no longer necessary, he shall by order terminate the same and such quarantine shall thereupon cease.*"

Your Committee was advised, however, that as long as the Senate was struggling with the Tariff Bill it would give no attention whatever to other legislation. Immediately upon the enactment of the tariff legislation, Senator Walsh arranged for a hearing on S. J. R. No. 9 before the Senate Committee on Agriculture and Forestry.

At an informal meeting on April 14, your Committee met with Senator Walsh in his office and went into the many details relative to this desired legislation. Senator Walsh was most courteous and agreed to go with your Committee and appear at the formal hearing before the Senate Committee on Agriculture and Forestry.

Your Committee, together with Dr. John R. Mohler, Dr. A. E. Wight, Dr. T. E. Munce and Dr. C. E. Cotton, in company with Senator T. J. Walsh, appeared before the Senate Committee on Agriculture and Forestry, Tuesday morning, April 15.

Your Committee was most courteously received and, despite some very strenuous objections from gentlemen representing the poultry industry, their arguments were favorably received by the Senate Committee.

The Senate Committee on Agriculture and Forestry added the following amendment to S. J. R. No. 9 by adding at the end of Sections 1 and 2 the following:

"If the Secretary of Agriculture after proper investigation shall determine that a quarantine of a State, Territory, or the District of Columbia, as authorized in this paragraph, is unwarranted or no longer necessary, he shall by order terminate the same and such quarantine shall thereupon cease."

The bill thus amended met with the approval of the United States Secretary of Agriculture and thus amended was presented to and passed by the Senate.

At a conference immediately following this hearing it was decided to have a resolution similar to Senate Joint Resolution Number 9 by Walsh introduced in the House of Representatives. Senator Walsh proceeded with your Committee to the House of Representatives. Mr. August H. Andresen, one of the representatives from the State of Minnesota and a Member of the Agriculture Committee of the House, agreed to introduce immediately a similar resolution. He also secured a prompt hearing before the House Committee on Agriculture.

Your Committee, together with Drs. John R. Mohler, A. E. Wight and C. E. Cotton, appeared before the House of Representatives Committee on Agriculture at 11 a. m. on April 17. Dr. John R. Mohler and Dr. W. J. Butler were given a limited time in which to present their plea. The representatives of the poultry interests were also given a time in which to present their objections.

No decision was taken at this hearing as Congressman Clarence Lea, representing the Petaluma District of California, requested additional time in which to confer with his constituents and hear from them.

This second hearing was set for April 28 and continued to May 7, 1930.

Owing to the delay in these hearings, your Committee was unable to be present at either of them, but Dr. John R. Mohler appeared and prepared a statement supporting our plea at the meeting on May 7.

We are sorry to advise you that owing to the objections of the poultry interests, Original House Joint Resolution No. 304, as introduced by Honorable August H. Andresen, was so amended by the House Committee on Agriculture as to make it most objectionable to your Committee. The amended resolution was designated as H. J. R. No. 326, and reads as follows:

HOUSE CALENDAR NO. 289

71ST CONGRESS

H. J. RES. 326

2d SESSION

(Report No. 1405)

IN THE HOUSE OF REPRESENTATIVES

May 1, 1930

Mr. ANDRESEN introduced the following joint resolution; which was referred to the Committee on Agriculture and ordered to be printed

May 8, 1930

Referred to the House Calendar and ordered to be printed

JOINT RESOLUTION

For the amendment of the Acts of February 2, 1903, and March 3, 1905, as amended, to allow the States to quarantine against the shipment thereto

or therein of live stock including poultry, from a State or Territory or portion thereof where a live stock or poultry disease is found to exist, which is not covered by regulatory action of the Department of Agriculture, and for other purposes.

Resolved by the Senate and House of Representatives of The United States of America in Congress Assembled, That the Act of February 2, 1903 (32 Stat. L. 792), as amended by the Act of February 7, 1928 (45 Stat. L. 59), be, and the same is hereby, further amended by adding at the end of section 2 thereof the following:

"Provided, That until the Secretary of Agriculture shall have made regulations and taken measures to prevent the introduction or dissemination of the contagion of a contagious, infectious, or communicable disease of live stock, including live poultry, from one State or Territory or the District of Columbia to another, nothing in said Act shall prevent or shall be construed to prevent any State, Territory, or District from enacting, promulgating, and enforcing any quarantine, prohibiting or restricting the transportation of any live stock, including live poultry, into such State, Territory, District, or portion thereof, from any other State, Territory, District, or portion thereof, when it shall be found, by the State, Territory, or District promulgating or enacting the same, that such contagious, infectious, or communicable disease exists in such other State, Territory, District, or portion thereof: Provided Further, That no quarantine so enacted shall be based upon a specific test which is not a test recognized and approved by the Secretary of Agriculture: And Provided Further, That the Secretary of Agriculture is hereby authorized, whenever he deems such action advisable and necessary to carry out the purposes of this Act, as amended, to cooperate with any State, Territory, or District, in connection with any quarantine enacted or promulgated by such State, Territory, or District, as specified in the preceding provisos."

Any State, Territory, or District, so promulgating or enacting such quarantine shall forthwith give telegraphic notice thereof to the Secretary of Agriculture and to the principal live stock quarantine official of such State, Territory, or District affected thereby. The Secretary of Agriculture is authorized to inquire into the need and propriety of any such quarantine at any time. On complaint of the principal quarantine official of any such affected State, Territory, or District that said quarantine is unwarranted, unduly drastic, or no longer necessary, the Secretary of Agriculture shall forthwith investigate the matter. If the Secretary of Agriculture, after proper investigation, shall determine that a quarantine of a State, Territory, or the District of Columbia, as authorized in this paragraph, is unduly drastic, unwarranted, or no longer necessary, he shall by order so declare, and such quarantine shall thereupon be modified or terminated in accordance with such order of the Secretary of Agriculture: *Provided, That in case of baby chicks no quarantine shall become effective until approved by the Secretary of Agriculture.*

Sec. 2. That the Act of March 3, 1905 (32 Stat. L. 1264) as amended by the Acts of March 4, 1913 (37 Stat. L. 831), and February 7, 1928 (45 Stat. L. 59), be, and the same is hereby, further amended by adding at the end of section 1 thereof the following:

"Provided, That until the Secretary of Agriculture shall have determined the fact that cattle or other live stock, including poultry, are affected with a contagious, infectious, or communicable disease, and has quarantined a State, Territory, or the District of Columbia, or a portion thereof, with reference to such disease, as provided in this Act, as amended, nothing in said Act shall prevent or shall be construed to prevent any State, Territory, or District from enacting, promulgating, and enforcing any quarantine, prohibiting or restricting the transportation of any live stock, including live poultry, into such State, Territory, District, or portion thereof, from any other State, Territory, District, or portion thereof, when it shall be found, by the State, Territory, or District promulgating

or enacting the same, that such contagious, infectious, or communicable disease exists in such other State, Territory, District, or portion thereof: *Provided Further*, That no quarantine so enacted shall be based upon a specific test which is not a test recognized and approved by the Secretary of Agriculture: *And Provided Further*, That the Secretary of Agriculture is hereby authorized, whenever he deems such action advisable and necessary to carry out the purposes of this Act, as amended, to cooperate with any State, Territory, or District, in connection with any quarantine enacted or promulgated by such State, Territory, or District as specified in the preceding provisos. Any State, Territory, or District so promulgating or enacting such quarantine shall forthwith give telegraphic notice thereof to the Secretary of Agriculture and to the principal live stock-quarantine official of each State, Territory, or District affected thereby. The Secretary of Agriculture is authorized to inquire into the need and propriety of any such quarantine at any time. On complaint of the principal quarantine official of any such affected State, Territory, or District that said quarantine is unwarranted, unduly drastic, or no longer necessary, the Secretary of Agriculture shall forthwith investigate the matter. If the Secretary of Agriculture, after proper investigation, shall determine that a quarantine of a State, Territory, or the District of Columbia, as authorized in this paragraph, is unduly drastic, unwarranted, or no longer necessary, he shall by order so declare, and such quarantine shall thereupon be modified or terminated in accordance with such order of the Secretary of Agriculture: *Provided*, That in case of baby chicks no quarantine shall become effective until approved by the Secretary of Agriculture."

(The amendments that your Committee objected to were the one providing for immediate telegraphic notice of any quarantine order issued and the one that in case of baby chicks "no quarantine shall become effective until approved by the Secretary of Agriculture." The Committee felt that it would probably take some time to get the approval of the Secretary of Agriculture and if there was an unfortunate disease in baby chicks or in poultry, the state was practically powerless to enforce its order.)

The House Committee on Agriculture refused to withdraw any of these objectionable amendments despite the many efforts made by your Committee.

The House Committee on Agriculture endeavored to present H. J. R. No. 326 to the House, but due to the fact that the Committee on Agriculture no longer had a special calendar Wednesday to consider bills, the resolution had to come up before the House on the Consent Calendar.

When the bill was presented to the House on the Consent Calendar, it was objected to by LeGuardia of New York, Jenkins of Ohio, and Johnson of Texas. Thus the resolution died in the House of Representatives, one objection under the Consent Calendar rule being sufficient to prevent its consideration.

(I will state that your Committee endeavored in every way to have this amended resolution presented to the House, and it was their desire that it would be passed by the House, in the hope that it would go before a conference committee. We had taken this matter up with Senator Walsh and had been assured that if this amended resolution was passed by the House, when it got to the conference committee every effort would be made to have the objectionable amendments withdrawn and a bill passed similar to the one introduced by Senator Walsh and passed by the Senate.)

S. J. R. No. 9 was passed by the Senate and transmitted to the House. The House of Representatives failed to act upon S. J. R. No. 9, thus it automatically died with the adjournment of Congress.

(There seems to be quite a little jealousy between the House and the Senate. That is why your Committee desired to have resolutions presented in both bodies, so that if the resolution passed in the House as a House bill or as a House resolution and the Senate resolution was passed by the Senate, it would not have been very difficult to have had it conferenced and the proper legislation enacted.)

Your Committee is absolutely in accord and agrees most heartily with the provisions contained in Senate Joint Resolution Number 9, introduced by Walsh of Montana.

Your Committee is opposed and recommends that the United States Live Stock Sanitary Association and any future committee that may be appointed by this Association oppose the objectionable features contained in the amended H. J. R. No. 326, Seventy-first Congress, Second Session.

Both Senator Walsh and Congressman Andresen deserve the appreciation and thanks of this organization for the support they rendered to the live stock interests in this matter. Congressman Andresen's original resolution was similar to the Walsh resolution. He worked diligently to have the states granted the legal right to enforce regulations governing the importation of live stock but the poultry interests were able to secure the incorporation of objectionable amendments which, in the opinion of your Committee, completely destroy the effectiveness of the original resolution.

Attached are copies of reports on the various hearings, Senate Calendar 719, Report Number 712 to accompany S. J. R. No. 9, together with Series L and Series L, No. 2, 71st Congress, 2nd Session, hearings on H. J. R. No. 304 by Mr. Andresen.

Your Committee recommends the adoption of the following resolutions of appreciation to Senator Walsh and Congressman Andresen:

WHEREAS, Honorable T. J. Walsh, Senator from Montana, has twice introduced and has twice succeeded in having passed by the Senate of the United States a resolution granting to the several states the right to promulgate regulations governing the importation of live stock and poultry into their respective states, and

WHEREAS, Honorable T. J. Walsh has consistently assisted and aided live stock sanitary control officers and the live stock interests of the United States in protecting live stock against dangerous diseases, now therefore, be it

Resolved, by the United States Live Stock Sanitary Association, in annual session in Chicago, Illinois, on December 3, 1930, That Senator Walsh be extended a rising vote of thanks and that this resolution be spread upon the minutes of the Association as a token of our appreciation for the consistent service he has rendered to the live stock interests and live stock sanitary control officials, and be it further

Resolved, That our Secretary be instructed to forward a copy of this resolution to the Honorable T. J. Walsh at Washington, D. C.

WHEREAS, Honorable August H. Andresen, Congressman from Minnesota, introduced a resolution in the House of Representatives granting to the states the right to promulgate regulations governing the importation of live stock and poultry into the respective states and

WHEREAS, He worked arduously for the enactment of this legislation and was most courteous to the Committee representing this Association, now therefore be it

Resolved, That a rising vote of thanks be extended to Honorable August H. Andresen for his assistance on behalf of the United States Live Stock Sanitary Association and the live stock interests of the various states, and be it further

Resolved, That a copy of this resolution be spread upon the minutes of this Association and that the Secretary be instructed to forward a copy of this resolution to Honorable August H. Andresen at Red Wing, Minnesota.

On account of the very serious objections raised against this legislation by the poultry interests, your present Committee recommends that each and every member of the United States Live Stock Sanitary Association and especially the live stock sanitary control officers of the various states get in

personal touch with their Representatives and explain to them the necessity of this legislation. We doubt if any Special Legislative Committee can secure this legislation without the active support of live stock sanitary control officers of the various states.

Twice this resolution has been passed by the Senate and twice it has died in the House.

We recommend that the Committee be continued.

DR. BUTLER: I move the adoption of this report.

DR. MOORE: I second the motion.

PRESIDENT WIGHT: You have heard the report. It has been moved and seconded that it be adopted. Is there any discussion?

DR. BUTLER: I think we should very heartily thank Dr. Cotton and Dr. Munce. They went to Washington with the Committee, at the expense of their states. They rendered a very active service to your Committee and to this Association. For myself personally I want to assure you that the Montana representatives will work for this resolution and they will work most diligently. They will do everything in their power, if you desire it reintroduced, to work for its passage, but from a personal standpoint (this is my personal idea), I would recommend that the Chairman of this Committee be someone other than the State Veterinarian of Montana. Montana is quite a distance away from Washington. Really, I think you should have someone as Chairman of this Committee who can be there constantly. They keep putting off these hearings. The poultry interests, as you know, have a paid lobbyist there. Dr. Cotton can tell you about them; they are very active. They know a lot of these representatives personally. I don't think there is any question about getting this resolution passed by the Senate, but you are going to have to work to get it passed by the House. It has died twice in the House now. The poultry interests don't want this legislation passed. Unless you have someone there or someone who can get to Washington quite handily, it is going to be more difficult to have it passed. You know I am two and one-half days, anyway, from Washington by night and day travel. It is pretty hard to get there. We did everything we possibly could. I don't know how much we spent for telegrams, but enough, I think, to have the Western Union declare a special dividend, but it didn't do much good; it is personal contact that counts.

DR. MOORE: How much support did you get from the state officials?

DR. BUTLER: Before we went to Washington, before this matter was taken up, I think I wrote to every state in the United States. I am sorry I can't answer you definitely, but I will say that we received very courteous replies from the southeastern states, but the other states didn't respond quite so heartily. It is just a matter that we overlook. We think that when we have a committee they can go down and get this thing passed. It won't work. If it is worth while, you have to fight for it.

PRESIDENT WIGHT: Dr. Cotton, have you anything to offer?

DR. C. E. COTTON: Mr. Chairman, I am not a member of the Committee. This report was given before the Executive Board on Wednesday, and they decided to request the Chairman, in his report today, just simply to summarize it. I personally objected because I felt that every man who has any interest in live stock sanitation in these United States should have all of the details. The Chairman has presented the report in full.

In the report of this Committee, Dr. Butler stated they feel the amendments were of such a nature that they practically defeated any good that might be obtained by such legislation. I don't agree with that. I have talked to Congressman Andresen and have talked to our Attorney General. Dr. Butler has been of the opinion that this amendment relative to the necessity of giving telegraphic notice to the authorities of states when you decide, in an emergency, to place an embargo on shipments therefrom, would be legally interpreted by a lawyer that it would be necessary, if it became a law, for each one of us immediately to wire a complete, true copy of all of our present state laws and rules and regulations, which would be prohibitive from a money standpoint. That was not the intent of the Committee or of the people who introduced it. It was simply that they would be given a notice thereof. I don't think there

would be any trouble in perhaps having the verbiage changed. These poultrymen use as an argument the conditions that prevailed as a result of the outbreak of European fowl-pest. You remember there were some very unreasonable regulations promulgated very hurriedly. They refer to that experience as their only argument. I personally am of the opinion, even if it becomes a law as it is, we are not defeated in the least. Our big problem is the control of the movement of live stock interstate.

I feel that I am really personally responsible for the appointment of this Committee, resulting from our very unpleasant experience in my state in undertaking to protect some interests that had imported diseased hogs from a western state. The attorneys of all of the railroads decided to give us a friendly suit, and defied me to start action. Our Attorney General stated that we were defeated before we started because of the decision in the case that Dr. Butler referred to, in the Oregon-Washington case. The railroads have been very nice. We haven't given any great publicity to the fact that our rules and regulations or state laws will not hold water. They continue to cooperate. I don't think the railroads will object to this legislation. We thought perhaps we might find some objection to it from the railroad representatives, but they are with us. They realize that it is to their interest to protect the live stock industry of this whole country. We want to impress upon this body that as control men and men who are responsible for the success of the live stock interests of their states, this should be our one effort in the next year. Don't ignore these notices; get busy. Men, this is serious. We should spend every dollar we have if necessary to obtain this legislation. I can't say too much to make it impressive. (Applause)

DR. BUTLER: Dr. Cotton and I don't always agree on details, but we agree on fundamental facts. I don't know of any one time when we disagreed on fundamental facts.

There is one other objection that Dr. Cotton didn't mention that the poultry interests raised. One of their arguments was: "Well, this is just a subterfuge on the part of Oregon, Washington and Idaho to reenact their legislation or their regulations relating to the introduction of baby chicks from the Petaluma district." I shouldn't say the Petaluma district, because it applied to all districts, but it affected more particularly the Petaluma district. While we assured them that the states mentioned had nothing more to do with this desire for legislation than any other state, I don't think they believed us.

I just want to read you that telegraphic notice part. You can decide for yourself:

"Any state, territory, or district so promulgating or enacting such quarantine shall forthwith give telegraphic notice thereof to the Secretary of Agriculture and to the principal live stock quarantine official of each state, territory or district affected thereby."

Your Committee felt that with that wording, any quarantine issued or any regulation issued, you would have forthwith to give immediate telegraphic notice to the sanitary officials of the various states. It does not specify any particular quarantine. It does not say by registered mail or any other way. It simply says, "by telegraphic communication." I tried by telegraph and by letters to have this amendment so worded that it would be clear to all of us, and there would be no question, but I was unable to secure favorable consideration.

Dr. Cotton says he doubts if it was the intent of the people introducing this particular amendment to destroy the effectiveness of the resolution. Personally, I think there was pretty good intent. This amendment was introduced by the poultry interests. To my way of thinking and to your Committee's way of thinking, it is very probable there was a serious intent upon their part to destroy the effectiveness of the resolution.

PRESIDENT WIGHT: Does anyone else wish to discuss this report? If not, are you ready for the question? It has been moved and seconded that the report of the Special Committee on Legislation be adopted.

DR. MAYO: By a rising vote, I think.

DR. BUTLER: A rising vote of thanks to Congressman Andresen and Senator Walsh.

PRESIDENT WIGHT: All in favor of the adoption of the report and expression of appreciation to Senator Walsh and Congressman Andresen will please rise.

The motion was carried unanimously by a rising vote.

PRESIDENT WIGHT: The next is a report of unusual interest to us this year. Dr. W. G. Hollingworth, of Utica, New York, is going to give us a little story in connection with his work as Chairman of the Committee on Milk and Meat Hygiene. (Applause)

Dr. Hollingworth read his paper.

MEAT AND MILK HYGIENE

By W. G. HOLLINGWORTH, Utica, N. Y.

Chief of Food Hygiene, Bureau of Health

Preventive medicine is increasingly dominating the thoughts of not only the medical and veterinary professions, but of the general public. Public policy requires conservation of human life, the preservation of public health and the establishment of public sanitation on a firm and workable basis. Upon food hygiene our health, wealth, happiness and prosperity depend to a great extent. Our vigor and success depend on our diet to a considerable degree. The quantity, quality and variety of food is of the greatest importance from a preventive medicine point of view.

Meat and milk form the major part of our food. They are the first of the necessities of life, especially milk. They must be made safe and wholesome and that is brought about by competent inspection and such consists in personal examination of foodstuffs wherever found, on shelves in grocery stores, meat markets or other places where they are handled, prepared, dispensed or served. The idea is to see to it that such products are carefully guarded according to the ideals of the three c's—clean, cool and covered, and wholesome.

Foods from the animal kingdom are more likely to convey infections or possess injurious properties than food from the plant kingdom. Meat and milk are the chief offenders. Our health and efficiency depend more perhaps upon the food we eat than upon any other single factor of hygiene. The hygienic conscience of the people has been aroused and a demand is being established for clean, fresh, wholesome foodstuffs.

The separation of the producer and the consumer and the demands in our larger cities have made sanitary reforms enormously necessary, pure food laws, meat and milk inspection acts and local surveillance over markets, provision shops, milk-plants and dairies, as well as food handlers, in regard to their health, are all parts of the general movement to obtain a wholesome food supply, due to the fact that people know more about the food

they consume than their forefathers did and they are constantly demanding more knowledge. Public sentiment is fast making suggestions along these lines. In fact, America is governed by public sentiment. But there is no use for such ordinances or rules and regulations if they are not enforced, as no law is any more effective than its administration.

Various states and municipalities have sanitary codes, especially on milk. But the great difficulty in carrying out the idea of such an undertaking is the lack of interest upon the part of the official under whose direction such enforcement comes—the head of the local health department in some of these cities and towns.

It is certainly a sad state of affairs and nobody has any better knowledge of such conditions than those of us who are conscientiously devoting our time and energy to correcting the neglectful ways in which our foods are handled, prepared, dispensed and served in such a large number of localities. There is a reason why! Whatever success has been made in my city is due to the wholehearted coöperation of the Health Commissioner with the Bureau of Food Hygiene, which consists of the Health Officer, the chief of the Bureau, a deputy, seven lay inspectors, seven regular nurses and twelve nurses in reserve, and the registrar.

We have no conception of the number of illnesses that are due to food poisoning, due to the fact that statistics are not kept of such maladies, unless some extensive outbreak occurs.

At this point I want to call attention to a condition with which some of you probably are familiar while others are not. It is in regard to so-called ptomaine poisoning. An outbreak occurred in our city. Forty-three were taken sick. All cases in which food is suspected come to the Bureau of Food Hygiene. We made an investigation. To make a long story short, we took the matter up with the physicians and the patients who were not too critically ill to be consulted, and we soon came to the conclusion that it was not the food that caused the trouble, but it was a material used in washing the dishes. This material was manufactured in New York and had a widespread sale over the United States. The active ingredient was 20 per cent of sodium cyanid. That of itself was no doubt the cause. It has received publicity all over the world. As I say, I feel very proud that it was our opportunity to locate that trouble, and it happened to be a veterinarian who detected it. I do not take any credit for it, but it was credit for the veterinary profession.

It is estimated that 8,000,000 are taken seriously ill daily in this country. If we only could tell how many of this number of illnesses were due to unwholesome food consumed unconsciously, it would put a different aspect on the necessity for food hygiene! It would give food for thought by those concerned in preventive medicine. Let it be much or little, it is the duty of sanitarians to emphasize the necessity of this phase of public health activities.

Every year more than 275,000,000 days are lost on account of sickness by the 42,000,000 persons engaged in a gainful way. It is easy to see that this unwelcome condition runs into billions of dollars and no doubt a large percentage of this enormous outlay could be prevented if the right methods were put into force. The question is: How much money is placed in the annual budget in your immediate vicinity to carry on this very important public health measure?

The veterinary profession to me is in a very envious position as to the services it can render to our various localities and I say that without fear of contradiction, due to the fact that when our services are called for in this line they become immediately popular. Our knowledge of comparative medicine puts us in demand with physicians in a helpful way in diagnosing certain types of human diseases. I wish to say that the Bureau of Food Hygiene in Utica has the hearty coöperation of all the physicians. Almost daily some of our physicians report certain illnesses in which they suspect that food is the cause. They ask the Bureau to investigate these cases. We are meeting with encouraging success.

The time has arrived, I think, when our veterinary colleges ought to change their curricula in such a way that veterinary students might receive more information and encouragement in the ideals of food hygiene, a phase of preventive medicine which has been neglected in the past. All the veterinary colleges are devoting more or less attention to food inspection. From my experience in coming in contact with young graduates, I find they do not seem to realize the great necessity of food inspection in regard to the technic of handling, preparing, dispensing and serving of food.

In the realm of medicine there is no phase of such importance as preventive medicine. The prevention of illnesses caused by the consumption of unwholesome food tomorrow is due to the information we receive today. There is no sounder test of government efficiency, whether federal, state or municipal, than the

care it displays in safeguarding the lives and health under its control.

The first requisite in a food supply for a community, state or a nation is that it shall be sufficient in amount, wholesome in quality and well-balanced.

Food hygiene plays an important role in what can be done in regard to checking disease. This Association is in a position to render great service to public health. We are living in an age of great waste, of which sickness and death are by far the largest. The general attitude in regard to public health has changed perceptibly in the last half-century. Veterinarians should become more interested, in order to receive recognition due them. Now is the time to get aboard the band-wagon, so to speak. A veterinarian should be connected with every health department.

God made the country, but the people made the towns. Whatever progress has been made is due to the individual. Our civilization depends upon health, and health very largely depends on the food consumed. It must be wholesome. The health of any community is greatly judged by the amount of safe milk it consumes.

Education is slower than legislation but it is surer. We are faced with the problem of devising a satisfactory and effective method for the distribution of knowledge in regard to food hygiene. Those of us who can render any service along this line owe it to humanity to give our time and energy for such laudible work.

Why I am so interested in food hygiene is to try and indicate what can be done to prevent or to lessen to a greater extent the diseases of animals that may be transmitted to the human family and to eliminate as much as possible the consumption of unwholesome foods.

Health work, more than any other similar activity, embraces all community groups. Its proper functioning is made possible by tax money to which all contribute, regardless of rank or station, and all share in the benefits resulting from its expenditure.

MEAT HYGIENE

Consumers should be educated to demand flesh from healthy animals and that guarantee is the stamp, marked "Inspected and Passed," placed there by the veterinary inspector, and cut up and handled in a careful manner by butchers free from disease, as

shown by a physician's health certificate and under sanitary conditions.

Consumers in the United States have been partially protected for about a quarter of a century in regard to wholesome meat (except in a few localities where a municipal meat inspection ordinance is in effect) and that is due to the federal meat Inspection Act, which has no peer. But just think of it! Why, in this enlightened country, do such conditions exist as are going on every day? Is it not time for some drastic action to be taken to right such a disgraceful wrong? I have no reason to believe that conditions are any better in some localities than others where no action is taken to prevent such nefarious acts. I have had the opportunity to know what I am saying. There is no use denying it. It seems to me that this Association is in a position to do yeoman service in this phase of preventive medicine. It is a duty we owe to humanity. I realize it would mean a great deal of thought and valor, but what are we here for? Any state legislature ought to be anxious to create such a laudable act. It is a duty they owe their constituents and if that is not forthcoming, then the municipalities should take the initiative.

From the experience I have had, I find the veterinarian is the ideal person to carry on food inspection and what can be done in one locality can be done in another. If it were not for the thorough cooking to which meat is subject, there would be more sickness.

Meat inspection means veterinary control of foodstuffs, which includes the detection of unauthorized preservatives and adulteration, as well as diseased conditions; along with game birds, fish, shell-fish, crustaceans and amphibians, poultry, etc. It has an economic as well as a public health value.

Advocate humane slaughter. How to care for beef after killing. Check on places where slaughtering and handling of meats are carried on. See that all condemned meats are destroyed; where a stamping station is set aside for such inspection. Viscera such as lungs and liver should be attached to the original carcass. We are finding that hog tuberculosis is on the decline.

Some cities have been obliged to place an embargo on meats, except that receiving federal inspection, and I am glad to know that such health officials have the guts (to be plain), to put such ruling into enforcement, but it may be a hardship for a packing company that lives up to the highest ideals of meat inspection to have its products ruled against. It does seem to me there should

be a certain amount of elasticity and good judgment given to such establishments; it would be an encouragement for them to go on with their good work. We have a few other cities that have such a ruling, but after investigation they gladly accept our products and in one instance we place the municipal stamp of another city, instead of our own stamp, on all meat products that are shipped to such municipality.

Since the establishment of an abattoir, I can speak of it only in the highest terms. With us, it has eliminated the farm slaughter. We are able to see our subject before and after slaughter. It has proven a great asset to our city meat inspection and a good investment for the packing company which owns it.

MILK HYGIENE

Milk inspection is of the greatest importance, due to the fact that milk is the only animal product that is consumed in its raw state. Consequently, it must be harmless and that being necessary it is made so by competent inspection. According to the last census, there are about 22,400,000 milk cows in the United States, on about 4,500,000 dairy farms, handled by millions of people. Now the impossibility of securing an adequate supply of properly safeguarded raw milk produced at a price within the reach of the masses is evident. This condition is a challenge to health authorities and demands correction.

Milk as a factor of health demands the attention of the health officials. They have two important questions to consider: (1) a sufficient supply and (2) an adequate quality.

Various states and cities are commencing to see the need of creating sanitary milk codes and ordinances, which is very encouraging. What is advocated by all is that milk should come from healthy cows under sanitary precautions, be properly cared for from the time it leaves the cow until it reaches the consumer, and this individual needs education in regard to the care of this very perishable food. The purest milk, when handled by an ignorant or careless person, can, in a short time, become a deadly poison to the baby.

Our New York State Department of Health, July 1, 1928, adopted a new Sanitary Milk Code and this year an amendment was added to the same. An organization has been created and is very effective. The result: Very efficient work is being completed.

The New York State Department of Health has been engaged during the past six months in making a general survey of the milk and cream supply of the State.

The field work is being carried on by two parties, each consisting of four technically trained men and each party having a bus fully equipped as a laboratory for making standard plate counts and Breed counts on milk. The laboratories are stationed each week in some city and samples brought in from neighboring cities or villages within a radius of about 15 miles. Samples are collected on the street from all dealers for standard plate counts. Breed counts are made of all producers' milk as delivered at plants and a representative number of dairy farms are inspected. No results are available at this time but it appears that the survey will be of some value in improving and making more uniform the sanitary quality of the milk supply of the State.

We have three popular grades of milk, "certified," "raw" and "pasteurized." In my locality, "certified" milk is falling off in sales. Grade "A" raw is being offered as a substitute. Due to the lesser requirements demanded in its production and handling, it sells at a much lower price than certified. As beforementioned, the issuing of permits to dealers is in some cases no more or less than a farce. A milk dealer will call on the health officer—that is, some of them—and ask for a Grade "A" Raw Milk Permit and he receives the same without any formalities. He, the health officer, takes the person's word, and that is all.

Now that causes friction with those who want to comply with any and all requirements. This unhealthy condition occurs in other parts, besides those with which I am familiar. The State Department of Health should be more active in finding some way to prevent such nefarious acts.

The selecting of capable milk inspectors is of the very greatest importance. Some of the requirements to make a person eligible for this very important position are too ridiculous to mention. Again, the veterinarian should be an educator, as life and death very often depend on his decision (as a milk inspector).

The number of milk inspectors in communities varies. The larger ones are well protected generally. Many others, with from 5,000 to 25,000 population, have no inspection at all. Moreover milk inspection, when it does exist, is as poor in some communities as it is good in others. It is distressing that a number of municipalities allow milk to be sold raw, which under our present regulations would not be accepted for pasteurization. The aim of our

work is to get the public "safe-milk-minded." The result means an increase in consumption.

Eternal vigilance is the slogan of the milk inspector. When we take into consideration what milk-borne outbreaks mean to public health, every precaution should be taken and enforced in order to lock the barn door before the horse is stolen. We must not be satisfied with such conditions, but the best or most efficient inspection will not be able to control milk-borne outbreaks entirely. We must seek to reduce or eradicate such conditions by removing or altering the responsible etiological factors. In my city all handlers of grade "A" raw milk must submit to various tests—for typhoid, diphtheria, etc., and report any sickness that may occur at the source of production. This is also required of grade "A" pasteurized milk dealers. What we are doing in small towns that are closely adjacent to each other, is to have them organize and arrange in their budgets according to the population, so it will be possible to hire a milk inspector and also arrange with a nearby laboratory to examine samples. It is working out very satisfactorily.

Public health has been greatly enhanced by the application of pasteurization. Pasteurizing plants must be closely watched. But, first and foremost, pasteurization must not take the place of sanitation. The quality of pasteurized milk depends to a great extent on the sanitary way in which such raw milk has been produced and handled. It is a preventive measure of public health importance. Universal pasteurization is not practical. Pasteurized milk is the cheapest kind of life insurance that a consumer can take out. It destroys dangers that inspectors cannot see and finally there is as yet no record of a milk-borne epidemic in which the milk had been pasteurized according to regulations and handled under sanitary precautions.

Bovine tuberculosis eradication should be pushed to completion. It was very gratifying to learn that Michigan had been added to the list of states that are free from bovine tuberculosis, along with Maine and North Carolina. This shows that a great amount of effort and veterinary skill have been brought into service. Let the good work go on. Many cities now demand that all milk must come from tuberculin-tested cows, whether for pasteurization or not.

Abortion infection is fast coming to the forefront as a cause of anxiety in milk hygiene. Some cities have added a new regulation to their codes. Philadelphia has one which became effective

March 1, 1930. It prohibits the sale of raw milk in that city unless it is from cattle that have been blood-tested and found free from abortus infection.

Abortion disease has become a great menace to the dairyman. Much research work is taking place. Measures should be taken to clean up herds, especially those which produce raw milk for consumption. Reports are continually being published, calling attention to outbreaks of undulant fever. There have been 93 milk-borne outbreaks in New York State, exclusive of New York City, since January 1, 1917, including those of typhoid and septic sore throat. Of these, 88 per cent originated on the farm. Outbreaks of septic sore throat are probably always milk-borne. There have been collected, by various writers, records of 42 outbreaks of this disease. In the point of numbers affected, it has been the most common milk-borne ailment in the past 19 years (21,045 cases with 139 deaths). The data are incomplete. The *Health News* of the New York State Department of Health reports a fatal case of undulant fever, it being the first death from this malady since this disease was made reportable. This person consumed raw milk.

Mastitis is another disease that works havoc to the dairyman. Milk coming from cows suffering from mastitis may become a serious menace to public health if consumed raw. Careful watchfulness of herds of dairy cows should be given by inspectors. This is another condition where municipal officials need information concerning the needs of more frequent visits of veterinarians to check up this malady. A metal cup with fine mesh is a great adjunct in detecting this malady.

In conclusion, meat and milk hygiene is rather expensive, but it is worth every cent expended, from a public health point of view. It pays the greatest dividends on the investment.

. . . Dr. Hollingworth then showed a number of slides. . . .

DR. HOLLINGWORTH: I move the adoption of the report. (Applause)

DR. WM. MOORE: I second the motion.

PRESIDENT WIGHT: You have heard Dr. Hollingworth's paper and the report of the Committee. It has been moved and seconded that the report be adopted. All in favor, say "aye"; opposed, "no." The report was adopted.

Next is the report of the Committee on Resolutions, by Dr. N. S. Mayo.

. . . Dr. Mayo read Resolution 1. . . .

RESOLUTION 1

WHEREAS, There are now pending before Congress bills designed to prevent further research involving the use of animals for experimental purposes, especially dogs, in the District of Columbia, and

WHEREAS, It is believed that such proposals for legislation constitute a threat to the progress of veterinary medicine and of the live stock industry, now, therefore, be it

Resolved, That the United States Live Stock Sanitary Association does protest against the enactment of legislation along the lines referred to, and does urge the members of Congress to utilize every proper effort to defeat measures pending before that body.

Upon motion regularly made and seconded, the resolution was adopted.

Dr. Mayo then read Resolution 2.

RESOLUTION 2

WHEREAS, The Scientific Research Committee of the American Association of Medical Milk Commissions is actively engaged, at the request of the American Association of Medical Milk Commissions, on problems concerning the improvement of the sanitary and nutritional qualities of milk, and in formulating a comprehensive outline for basic research on milk; and,

WHEREAS, The need is recognized for fundamental work on this all-important food, therefore, be it

Resolved, That the United States Live Stock Sanitary Association commends the work and aims of this eminent committee and urges the fullest coöperation of all institutions, organizations and individuals interested.

DR. MAYO: The members of the Committee are as follows:

Dr. J. Howard Brown, Johns Hopkins Medical School.

Dr. D. J. Davis, University of Illinois Medical School.

Dr. W. D. Frost, University of Wisconsin.

Dr. F. S. Jones, Rockefeller Institute for Medical Research.

Dr. E. V. McCollum, Johns Hopkins School of Hygiene.

Dr. K. F. Meyer, Hooper Foundation, University of California.

Dr. M. J. Rosenau, Harvard Medical School.

Upon motion regularly made and seconded, the resolution was adopted.

Dr. Mayo then read Resolution 3.

RESOLUTION 3

WHEREAS, It has become the general practice of live stock feeders to purchase the major portion of their cattle through the various public stock yards of the nation, and,

WHEREAS, The dissemination of that class of infections commonly designated as "stock yards diseases" occasions such heavy financial losses to the cattle-feeding industry as to represent a serious economic problem, and,

WHEREAS, It is confidently believed that an earnest and conscientious study of the sanitary problem involved as well as the methods of handling such consignments will result in the formulating of regulations that will be highly advantageous in the prevention of diseases of this character, therefore, be it

Resolved, That a committee of three, one of whom shall be a representative of the United States Bureau of Animal Industry, be appointed by the President of this Association to study this problem and that they be instructed to formulate and recommend to this Association at its next meeting such regulations as in their judgment may be successful in materially reducing the amount of diseases of this character.

Upon motion duly made and seconded, the resolution was adopted.

. . . Dr. Mayo then read Resolution 4. . . .

RESOLUTION 4

WHEREAS, Senate Bill 4133, by Senator McNary, for promoting the economic welfare of the dairy industry, and for other purposes, will be reintroduced in both the House and Senate of the now existing session, and,

WHEREAS, This bill is of vital welfare to the dairy industry and of interest to the veterinary profession, therefore, be it

Resolved, That the United States Live Stock Sanitary Association, in session at Chicago, Ill., December 3-4-5, 1930, does individually and collectively endorse this bill and most urgently request the members of the House and Senate to pass this bill at this session of Congress, and be it further

Resolved, That a copy of this resolution be sent by Secretary O. E. Dyson to Senator McNary and copies be supplied all members of this Association, and be it further

Resolved, That each and every member of this Association shall write his respective Senators and Representatives in Congress to actively support and pass this bill.

DR. MOORE: What is the bill?

DR. MAYO: Unfortunately, some of these resolutions come in so late that it was impossible to make a satisfactory survey of them. I will read one paragraph of this bill.

. . . Dr. Mayo then read sections of the bill. . . .

DR. MAYO: From the very limited information that I have upon this subject, it would appear that it is the object of this bill to place the control of milk products under the purview of dairying in the Department of Agriculture in a somewhat similar way that the control of animal diseases is handled by the Bureau of Animal Industry.

MR. A. J. GLOVER: Mr. Chairman: I happen to know considerable about the McNary bill. I do not know who wrote the resolution that has been presented here. I had no idea a resolution was coming up here to approve the McNary bill. I ought to say, for the benefit of some of my old friends, that, in being President of the American Dairy Federation, I have been assisting to adjust a difference which exists between the Public Health Service, the Bureau of Dairy Industry, and the dairy industry. The McNary bill proposes to do what the officials of the Bureau of Dairy Industry and the Public Health Service have been attempting to adjust for a year or more. It is a position of the American Dairy Federation that if this difference cannot be settled within the government we will then use every effort to have the McNary bill enacted into a law, but will request that section 3 be amended in substance as is proposed in the resolution offered. Permit me to give an outline of a letter which I wrote to Honorable B. D. Wainwright, Jr., concerning this bill, as it gives what the American Dairy Federation considers the proper relationship between the Public Health Service and the Bureau of Dairy Industry:

"For the past several years the work of the Public Health Service has created considerable dissatisfaction in various sections of our country; due largely, I believe, to the arbitrary position it takes concerning its proposed milk ordinance and its lack of coöperation with the Bureau of Dairy Industry and the dairy industry. The Public Health Service assumed the role of milk sanitation work back in 1923 and has continued in its efforts to have its ordinance accepted by the dairy industry and the local and state health departments.

"Its work started in the South, where the dairy industry is small and many cities had no milk ordinance. Even in that section of our country protests have been entered against the proposed milk ordinance, but the real difficulty came when attempt was made to have the ordinance introduced in cities where dairying had developed into an industry. The

Public Health Service has usurped responsibilities and activities which clearly belong to the Bureau of Dairy Industry. This has created dissatisfaction in every branch of the dairy industry.

"The Public Health Service milk ordinance provides for grades of milk which the dairy industry considers unsafe and, if adopted by cities in the dairy sections, would provide for lower standards in many cases than are now in existence. The dairy industry thinks that the promulgation of the so-called standard milk ordinance and code by the Public Health Service is a serious mistake, for no single set of regulations can fit the varying dairy conditions in this country. Unless proper machinery is set up for its enforcement, it brings false assurance to the consumer and works an injustice to the dairy farmer who is attempting to produce a wholesome grade of milk. These unsatisfactory conditions caused the American Dairy Federation, representing the various branches of the dairy industry, to attempt to have an adjustment made between the Bureau of Dairy Industry and the Public Health Service so that each department could carry on its work effectively and in its proper field.

"After carefully studying the function of each department and its relationship to the dairy industry, we came to the conclusion that the Public Health Service should direct itself to the study and control of milk-borne disease, as well as investigating laboratory methods for detecting pathogenic bacteria. Its duties also would be to study water supplies, methods of sewage disposal, and methods of pasteurization. It should supply the milk and state health officials with information concerning milk-borne diseases and laboratory methods of interpreting and detecting them, outlining what it considers safe milk. This gives a proper field of endeavor to the Public Health Service and one that is of vital importance to the dairy industry, as well as to the consuming public.

"The work of the Bureau of Dairy Industry has to do with the production of milk and this naturally involves sanitation. It is its duty to study methods of producing and handling milk which will comply with state laws and regulations, and give such information as necessary for state legislatures to have when enacting milk laws. It is the job of the Dairy Bureau to determine how sanitary, healthful milk of low bacteria count can be produced, and then to carry this information to producers. The Bureau of Dairy Industry should study milk-plants and the proper methods of handling milk. Its natural function is to assist in educating the farmer as to the proper ventilation of his barns, the arrangement of stalls to keep his cattle clean, the lighting of barns, and proper methods of milking, cooling, and handling milk. Congress created the Bureau of Dairy Industry to do this very thing.

"I recognize that there are certain coöperative projects: that is, there are joint activities that make it imperative for the Public Health Service and the Bureau of Dairy Industry to work together. For example, there is need for what may be termed a skeleton milk ordinance which can be used throughout the United States in the preparation of a milk ordinance which will meet local conditions. It is my belief that a better ordinance can be drawn with the assistance of men trained in sanitary milk production and men trained in public health work than if left to either department alone to draw an ordinance. Pasteurization is one activity which belongs in both departments, and there should be the closest kind of coöperation in the study of methods and practices of pasteurization. The two departments may come together in other ways, and for this reason there should be set up between them a committee that will work together on the things that touch both. In other words, the Public Health Service should not concern itself with milk production, for that belongs to the Bureau of Dairy Industry. The Public Health Service should devote itself to milk-borne diseases, their causes and control."

MR. GLOVER: I would be in favor of passing the resolution, provided that section 3 of the McNary bill did not particularly point out the institution before which this matter should come. It is my opinion that the Public Health Service should continue to take care of milk-borne-disease investigations.

DR. MAYO: The amendment as it now reads is as follows, and here is where the particular organization that you object to is mentioned: "Except that the National Institute of Health may prosecute research or investigational work on milk-borne diseases and other health aspects of milk."

DR. EDWARD RECORDS: Dr. Mayo, what is the name of the unit mentioned there?

DR. MAYO: National Institute of Health.

DR. RECORDS: Isn't that the new name for the enlarged department that was the Public Health Service?

MR. GLOVER: I can't just answer you, but I think it is sort of an advisory committee of some kind in public health work, but it isn't as I understand it, the Public Health Service.

DR. RECORDS: I think you are wrong. Congress recently enlarged the scope of and somewhat consolidated the Hygienic Laboratory and the federal Public Health Service. I think this is merely the new name for the same old thing.

MR. GLOVER: If that be the case I withdraw my objection to it, but I feel the Public Health Service should have to do with milk-borne diseases.

DR. RECORDS: I can't guarantee that.

DR. BUTLER: Mr. Glover, you know in Montana we worked with the old Public Health Service on spotted fever. The new name they are working under is the name as given by Dr. Mayo, the National Institute of Health.

MR. GLOVER: I withdraw my objection.

PRESIDENT WIGHT: Are you ready for the question? All those in favor of adopting the resolution presented by Dr. Mayo please signify by saying "aye"; contrary, "no." The resolution was adopted.

. . . Dr. Mayo then read Resolution 5. . . .

RESOLUTION 5

WHEREAS, The veterinary profession is the only one that is fundamentally trained and educated scientifically and practically in meat and milk inspection, and

WHEREAS, There exists a tendency on the part of some state and municipal officials to employ unqualified laymen or professional persons who are not specifically trained to do efficient public service in either milk or meat inspection, therefore, be it

Resolved, That the United States Live Stock Sanitary Association, in convention at Chicago, Ill., December 3-4-5, 1930, hereby states:

(1) That efficient and safe meat and milk inspection can be done only by graduate veterinarians, who have had specific instruction and training in animal pathology and in the diseases of meat- and milk-producing animals.

(2) That all supervising, directive and actual meat and milk inspection for the protection of public health are functions of, and belong to, the specifically trained graduate veterinarian.

(3) That we urge the colleges of veterinary medicine to pay especial attention to and develop the instructive and practical work in both meat and milk inspection.

(4) That the President of this Association should appoint a special committee of three of its members to make a study of the ways and means by which graduate veterinarians may occupy and work the entire field of meat and milk inspection in all cities and states, and for the federal government.

. . . Upon motion duly made and seconded, the resolution was adopted.

PRESIDENT WIGHT: Gentlemen, with your permission I will present this brief report on legislation that was taken care of by Professor Smith who had to go home.

. . . President Wight read the report. . . .

REPORT OF THE COMMITTEE ON LEGISLATION

MR. H. R. SMITH, *Chairman*, Chicago, Ill.

Mr. M. G. Thornburg, Des Moines, Ia. Dr. D. E. Westmorland, Frankfort, Ky.
Mr. A. J. Glover, Fort Atkinson, Wis. Mr. Charles Johnson, Hartford, Conn.
Dr. C. C. Hisel, Oklahoma City, Okla. Mr. R. C. Wilson, Dover, Del.

The report of the Committee on Legislation will be brief this year, because but few legislative matters have needed attention.

The Chairman of your Committee, together with a representative of the poultry industry, a representative of the American Farm Board Federation and the National Grange, were given a hearing before the Director of the Budget in Washington, D. C., March 27, 1930, in behalf of a federal appropriation for work on avian tuberculosis.

An item of \$60,000 has been inserted in the annual budget with the approval of the Director of the Budget and there is reason to believe this item will be approved by the present Congress. This appropriation, which no doubt will be supplemented by state funds, will prove very useful in furthering the eradication of tuberculosis in poultry in the states where this is a serious problem.

The loss caused by the presence of the avian tubercle bacillus in hogs is, at the present time, in excess of 5 cents per head on all hogs slaughtered in the United States, or a total of approximately \$2,500,000 annually. The loss to the poultry industry itself caused by this disease is infinitely greater than that amount. More active work on this problem is, therefore, of great importance in a large group of the states.

Avian tuberculosis is very prevalent in the north central and middle west states. Recent reports on the percentage of hogs retained at some of the southern markets indicate that this disease has been spreading southward to some extent. Fortunately, a number of states have adopted regulations which became effective September 1, 1930, to prevent as far as possible any further interstate movement of tuberculous breeding poultry, which movement has been largely responsible for the spread of this disease in poultry.

This regulation requires the tuberculin test on chickens four months of age or over, entering the state for purposes other than immediate slaughter, unless such poultry has been produced in flocks designated by proper federal and state authorities as tuberculosis-free accredited flocks.

These regulations have been adopted by the following states: Alabama, Arkansas, Florida, Georgia, Mississippi, North Carolina, Oklahoma, Texas and Virginia. If enforced, they should prevent to a large extent the further admission of tuberculous breeding poultry and at the same time should stimulate the owners of pure-bred flocks which sell breeding stock to have their flocks placed under federal and state supervision for the annual application of the tuberculin test. This will serve to improve conditions in the source of supply and make the hazard much less to the purchasers. Legislation for the supervision of accredited flocks is desirable in some of the states.

Your Committee has aided in the passage of legislation in some of the states where county area testing is well advanced to provide for the compulsory test without county petitions. This legislation is very desirable in those states where a large majority of the counties have voluntarily come under the test. It seems only fair to those counties which are accredited to have state legislation that will compel a comparatively few backward counties to come under this plan as a protective measure against reinfection and to complete the work in the state at the earliest practicable date.

There is need of this legislation in some of the other states this coming winter and your Committee will aid in bringing about such legislation. There is also need of legislation or regulations, particularly in the states which have completed or nearly completed the county area testing, to prevent the introduction of feeding cattle as well as breeding cattle without being tested, unless such cattle are produced in a tuberculosis-free accredited county.

Western feeding cattle are not a serious source of infection, but when a state has expended large sums of money in the cleaning-up process, it would

seem a wise procedure to stop all possible leaks to prevent reinfection from any source.

It is to be hoped that this Committee will aid in the passage of such legislation when the work in any state has reached the position where it is needed.

Upon motion duly made and seconded, the report was adopted.

PRESIDENT WIGHT: The next on our program is the election of officers. Under a resolution of the Executive Committee, this year there was a special committee of three appointed to be known as the Nominating Committee. At this time I shall call on the Chairman of the Committee for this report, Dr. Crewe.

DR. W. F. CREWE: As the President has stated, the Executive Committee provided for the appointment of a committee of three members of the Executive Committee in good standing, to present names of candidates for offices of this Association for the ensuing year. The Committee prepared such a list and submitted it to the Executive Committee and it was approved by them.

The candidate selected for President is Dr. J. W. Connaway, of Missouri. (Applause)

PRESIDENT WIGHT: Dr. Connaway, of Missouri, has been nominated for President for the ensuing year.

DR. C. A. CARY: I move that the nominations be closed and that Dr. Connaway be unanimously elected President of this Association.

DR. A. T. KINSLEY: I second the motion.

PRESIDENT WIGHT: It has been moved and seconded that the nominations be closed and that the Secretary be instructed to cast a ballot for Dr. Connaway as President. All in favor signify by saying "aye"; opposed, "no."

Dr. Connaway is elected our President for the ensuing year.

Now we have three vice-presidents.

DR. CREWE: Dr. E. T. Faulder, of New York, was selected as First Vice-President.

PRESIDENT WIGHT: Dr. E. T. Faulder, Director of the New York Bureau of Animal Industry, has been nominated for First Vice-President.

DR. MOORE: I move that the nominations be closed and that the Secretary cast a ballot for Dr. Faulder.

DR. RECORDS: I second the motion.

PRESIDENT WIGHT: It has been moved and seconded that the nominations be closed, and the Secretary cast a ballot for Dr. Faulder as First Vice-President for the ensuing year. All in favor please say "aye"; contrary, "no." Dr. Faulder has been elected First Vice-President.

DR. CREWE: Dr. W. K. Lewis, of South Carolina, has been selected for Second Vice-President.

PRESIDENT WIGHT: Dr. W. K. Lewis, State Veterinarian of South Carolina, has been nominated for Second Vice-President.

DR. MAYO: I move that the nominations be closed and the Secretary be instructed to cast a ballot for Dr. Lewis.

The motion was regularly seconded.

PRESIDENT WIGHT: It has been moved and seconded that the nominations be closed and the Secretary cast a ballot for Dr. Lewis. All in favor say "aye"; opposed "no." Dr. Lewis has been elected as the Second Vice President.

DR. CREWE: Dr. Edward Records, of Nevada, has been nominated as Third Vice-President.

DR. WILLIAMS: I move that the nominations be closed and Dr. Records be declared elected by acclamation.

The motion was regularly seconded.

PRESIDENT WIGHT: It has been moved and seconded that nominations be closed and that Dr. Edward Records of Reno, Nevada, be elected by acclamation. All in favor of Dr. Records as Third Vice-President will please signify by saying "aye"; contrary, "no." That constitutes the election of Dr. Records by acclamation.

The next on the program is new business. Is there any new business? I shall be glad to entertain almost anything. We have had three days of important business. The attendance at this meeting has certainly been gratifying to those of us who have been here all the time. There has been good attendance

at all times, especially the first two days. I trust that the time you have spent here will serve to be profitable in the future. I thank everyone for the hearty cooperation given me. If there is nothing further under new business, I will be pleased to have Dr. Connaway and the three vice-presidents come forward. (Applause)

Gentlemen of the Association, this is your President for the ensuing year. (Applause)

Dr. Faulder had to go home. You all know him.

Next is Dr. Lewis, State Veterinarian of South Carolina, and Dr. Edward Records, State Quarantine Officer of Nevada. (Applause)

President Connaway took the chair.

PRESIDENT CONNAWAY: I certainly feel grateful to the Association for this honor. I have been attending the meetings for a good many years, and I have observed that there are great responsibilities. If I can measure up to the capacity of those who have preceded me, I shall feel happy.

The success of the Association in its work depends more upon the members than it does upon the President. It depends very largely upon the work of committees. It shall be my endeavor to appoint the best committees possible for the various activities that must be carried out. That means that many, and in some cases probably all, of the old members of some of these committees, who have been active and know the work, will have to shoulder the responsibilities for another year. But I shall, at a later time, and after consultation with these men, announce the various committees.

I, as you know, have been a member of this Association for a great many years, in fact from its very beginning, and have seen it grow from a small handful dealing with a single disease, Texas fever, up to a situation where they are dealing with all problems of live stock sanitation for the United States in an advisory capacity and in an educational way. I hope that we will keep fine relations with all of the official agencies that have the real work to do. I think that is all I need to say.

I will ask Dr. Lewis, the Second Vice-President, to make his bow to you. (Applause)

SECOND VICE-PRESIDENT LEWIS: Mr. President and Gentlemen: I feel it a great honor, indeed, to be elected to this position, to represent my portion of the United States at this great meeting and in this great Association.

I have been attending the meetings here for the past twelve or fourteen years, and I must say that the information and knowledge gained here have been of wonderful assistance to me in transmitting to others the development of the live stock industry in my respective section.

I wish to assure the President that any time we can be of assistance to him in any way, in conducting this program, he should not hesitate to call upon us. (Applause)

PRESIDENT CONNAWAY: Dr. Records. (Applause)

THIRD VICE-PRESIDENT RECORDS: I don't think it is necessary to say much or say anything, except to thank the Association for honoring the Inter-Mountain country for a place on the cabinet of the new President. (Applause)

PRESIDENT CONNAWAY: Has the Secretary any business to bring up?

SECRETARY DYSON: No.

PRESIDENT CONNAWAY: Is there any new business?

DR. MOORE: I move that this Association give to Dr. Wight and the other officers of this Association a rising vote of thanks for the splendid meeting we have had here this week.

The motion was regularly seconded by several.

PRESIDENT CONNAWAY: You have heard the motion. Those in favor will rise.

The motion was carried unanimously by a rising vote.

PRESIDENT CONNAWAY: That brings our meeting to a close.

The meeting adjourned at 4:00 p. m.

ADJOURNMENT

APPENDIX

FINANCIAL STATEMENT

O. E. DYSON, *Secretary-Treasurer*

RECEIPTS		DISBURSEMENTS	
Membership dues		Printing 1929 reports.....	\$ 395.19
326 @ \$2.00.....	\$ 652.00	Stenographic report.....	147.36
State memberships		Postage.....	93.79
34 (see list) @ \$25.00....	850.00	Special Legislative	
Reports sold		Committee expense.....	584.35
U. S. B. A. I.....	\$75.00	Printing and stationery...	44.30
Canada Dept. Agr.	50.00	Clerical hire.....	18.25
Penna. B. A. I....	25.00	Express.....	4.46
Miscellaneous....	10.00	Telegrams.....	4.97
		Programs.....	36.60
	160.00	Safe deposit box.....	3.00
Interest on U. S. Bonds and		Rebate on membership....	2.00
Treasury Certificates....	129.39		
Total Receipts.....	\$1,791.39	Total.....	\$1,334.27
1929 Cash Balance (less		Cash Balance, December 1,	
prepaid memberships)...	200.91	1930.....	658.03
	\$1,992.30		\$1,992.30
CURRENT ASSETS—U. S. Treasury Certificates.....			\$2,000.00
U. S. Liberty Bonds.....			1,500.00
Cash Balance in Bank.....			658.03
			\$4,158.03

LIABILITIES—None.

STATE MEMBERSHIPS

Alabama	Iowa	Nebraska	Pennsylvania
California	Kansas	Nevada	South Carolina
Colorado	Kentucky	New Hampshire	Texas
Connecticut	Maryland	New Jersey	Utah
Florida	Massachusetts	New York	Vermont
Georgia	Michigan	North Carolina	Virginia
Idaho	Minnesota	North Dakota	Wisconsin
Illinois	Mississippi	Ohio	
Indiana	Montana	Oklahoma	Total—34

U. S. Bureau of Animal Industry
Canada Department of Agriculture

December 1, 1930.



CHANGES RELATIVE TO VETERINARY OFFICERS

Regular Army

The following-named officers are relieved from duty at the Army Veterinary School, Army Medical Center, Washington, D. C., effective upon completion of their course of instruction at the Medical Field Service School, Carlisle Barracks, Pa., and will proceed to stations specified for duty:

Captain Claud F. Cox, Remount Purchasing & Breeding Hdqrs., Fort Douglas, Utah.
 Captain Solon B. Renshaw, Fort Bliss, Texas.
 Captain Burlin C. Bridges, Fort Oglethorpe, Ga.
 Captain Oness H. Dixon, Jr., Fort Jay, N. Y.
 Captain Arthur D. Martin, Fort Ethan Allen, Vt.
 Captain Raymond Randall, Army Medical School, Washington, D. C.
 Captain Robert P. McComb, Fort Logan, Colo.
 2nd Lieut. Austin T. Getz, Fort Des Moines, Ia.
 2nd Lieut. Edgerton L. Watson, Fort Myer, Va.

Major Clifford C. Whitney is assigned to duty at Fort Clark, Texas, upon completion of his present tour of duty in the Philippine Department.

Major Jean R. Underwood is relieved from duty at Fort Clark, Texas, effective at such time as will enable him to proceed to San Francisco, Calif., and sail on the transport scheduled to leave that port on or about May 27, 1931, for duty in the Philippine Department.

So much of orders as directs Colonel Eugene J. Cramer, Fort Bliss, Texas, to proceed to his home on or about Dec. 31, 1930, and await retirement, is amended to direct him to proceed to his home on or about July 31, 1931.

Lt. Col. Robert J. Foster is relieved from assignment and duty as station veterinarian, Fort Omaha, Nebr., attending veterinarian, Fort Crook, Nebr., and additional duty at Headquarters, 7th Corps Area, to take effect on or about June 1, 1931, and assigned to Fort Bliss, Texas, for duty.

Orders assigning 1st Lieut. Verne C. Hill to duty at Madison Barracks, N. Y., are amended so as to assign him to duty at Fort Monroe, Va., effective upon completion of his present tour of foreign service.

Captain Howard N. Beeman is relieved from duty at the Remount Purchasing and Breeding Hdqrs., Lexington, Ky., effective on or about June 1, 1931, and assigned to duty at Front Royal, Va.

Veterinary Reserve Corps

New Acceptances

Kinsley, Albert Thomas... Major... 1103 E. 47th St., Kansas City, Mo.
 Gallahue, Thomas Patrick 1st Lt... 1314 Ash St., Waukegan, Ill.
 Nash, Rex Isaac..... 2nd Lt... Swayzee, Ind.

Promotions

To

Patton, John Arthur..... Captain. Lock Box No. 3-S, Sioux City, Ia.
 Loder, George Donald..... 1st Lt... 71 W. Schofield St., Portland, Ore.
 Bolin, Walter Lesley..... 1st Lt... Turtle Creek, Wis.

MISCELLANEOUS



OHIO STATE VETERINARY CONFERENCE

The sixth annual veterinary conference of the College of Veterinary Medicine, the Ohio State University, will be held March 18, 19 and 20, 1931. This year the program will include some of the foremost veterinary educators in this country and the entire time will be devoted to the discussion of topics of vital interest to every veterinarian who can be present on this occasion. No effort has been spared in arranging the details for this conference and the quality and type of the program.

The program this year will include clinical work for both large and small animals, which should prove to be an attraction to all interested in the practical side of veterinary medicine. The clinical material will be for the purpose of definitely illustrating a number of the important surgical and medical problems confronting the practitioner at the present time.

It is now recognized that such intensive short courses provide the necessary educational opportunities for the busy practitioner. The College of Veterinary Medicine hopes it will be possible for a large number to avail themselves of this opportunity to receive the very latest information concerning many of the real problems in their various fields of activity.

These short courses are sponsored by the College of Veterinary Medicine, believing it can render a real service to the live stock industry through the veterinary profession. It has been very gratifying to those who have been interested in promulgating these courses from year to year, to find the keen interest manifested and the large attendance by members of the profession. An invitation is hereby extended to all veterinarians to be present on this occasion to receive, we feel sure, much of value from an educational point of view.

Programs of the conference will be mailed soon. You will observe in looking it over the names of many nationally known experts in their specific lines of work assuring you of an excellent and instructive program during the entire period.

O. V. B.

NECROLOGY

J. J. DRASKY

Dr. J. J. Drasky, of Onida, South Dakota, died at his home, January 18, 1931, following a paralytic stroke.

Born at Kostelec, Czecho-Slovakia (formerly Bohemia), October 28, 1867, Dr. Drasky, at the age of nine, accompanied his parents to America and located at Crete, Nebraska. After attending grade school he entered the Ontario Veterinary College and was graduated in 1894. He returned to Crete and entered private practice.

In 1901, Dr. Drasky entered military service as veterinarian in the Quartermaster Department, 14th Infantry, and served for three years in the Philippines and China. Upon his return to the United States he took a postgraduate course at the Kansas City Veterinary College (1905) and then reentered private practice at Crete, Nebr. In 1918 he removed to Onida, South Dakota, taking up a farm about three miles from town.

Dr. Drasky joined the A. V. M. A. in 1898. He was a member of the South Dakota State Veterinary Medical Association, the Nebraska State Veterinary Medical Association and the Missouri Valley Veterinary Association. He is survived by his widow (née Frances Kubeck), three sons, two daughters, one brother and three sisters.

HENRY D. CLARK

Dr. Henry D. Clark, of Fitchburg, Mass., died February 4, 1931.

Born in Plainfield, Mass., October 26, 1865, Dr. Clark was graduated from Massachusetts Agricultural College in 1893 and the Veterinary Department of McGill University in 1895. For a few years he practiced at Milford, Mass., and in 1899 located in Fitchburg, where he conducted a general practice until his death.

Dr. Clark joined the A. V. M. A. in 1901. He was a member of the Massachusetts Veterinary Association, the Grange, Fitch-

burg Rotary Club, Fitchburg Chamber of Commerce, Fitchburg Fair Association, the Masonic Order, and at one time was a member of the Massachusetts State Board of Agriculture.

He is survived by his widow, three daughters and two sons, one of whom, Dr. Chester F. Clark (Mich.'29), is a member of the veterinary staff at Michigan State College.

CHARLES L. E. KERR

Dr. Charles L. E. Kerr, of Memphis, Tenn., died in the Baptist Memorial Hospital, Memphis, February 10, 1931, following a paralytic stroke four days previously.

Born at Brookborough, Ireland, June 1, 1874, Dr. Kerr came to the United States as a boy of five. He received his veterinary training at the Cincinnati Veterinary College. He was graduated in 1910 and shortly thereafter entered the service of the U. S. Bureau of Animal Industry, and was assigned to meat inspection. He was engaged in his official duties at the Beasley Packing Company, Hollywood, when he was taken ill. Previous to his assignment at Memphis, Dr. Kerr had been stationed at East Saint Louis, Ill.; Macon Ga., and Nashville, Tenn.

Dr. Kerr joined the A. V. M. A. in 1918. Interment was at Macon, Ga. He is survived by his widow, one daughter, three sisters and two brothers.

CARROLL LINWOOD HAYES

Dr. C. L. Hayes, of Avon, Ill., died at his home, February 17, 1931. Death was sudden and was caused by angina pectoris.

Born at Gatesville, North Carolina, February 8, 1885, Dr. Hayes removed to Illinois as a youth and located at Maquon. At the age of 21, he enlisted in the U. S. Army, at Fort Omaha, Nebr. In 1912, he entered the Chicago Veterinary College and finished there in 1915. He first practiced at Fairview, Illinois, shortly later going to Avon, where he entered partnership with Dr. W. Lester Hollister (Chi. '10). In 1926 Dr. Hayes established his own offices at Avon and Bushnell.

Surviving Dr. Hayes are his widow, one son, two brothers and one sister.
